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Ivanpah Energy Center

Draft Environmental Impact Statement

Volume 1






Prepared for

Lead Agency
U.S. Department of the Interior
Bureau of Land Management
Las Vegas Field Office

Cooperating Agency
U.S. Department of Energy
Western Area Power Administration
DOE/EIS-0354

On behalf of

Ivanpah Energy Center, LP
a Diamond Generating Corporation Company
Los Angeles, California

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Submitted by

PARSONS

November 2002

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ENVIRONMENTAL IMPACT STATEMENT

VOLUME 1

Prepared For:

Lead Agency

United States Department of the Interior
Bureau of Land Management
Las Vegas Field Office

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Cooperating Agency

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ENVIRONMENTAL IMPACT STATEMENT

VOLUME I

Proposed Pine

Lead Agency

United States Department of the Interior
Bureau of Land Management
Lone Mesa Field Office

Cooperating Agency

United States Department of Energy
Western Area Power Administration
[redacted]

For Publication

Hydrogen Energy Center, LLC
A Diamond Generating Corporation Company
Los Angeles, California

Submitted by

[redacted]

NOVEMBER 2007

Abstract

Ivanpah Energy Center, L.P., a Diamond Generating Corporation Company, a subsidiary of Mitsubishi Corporation proposes to construct and operate a 500 Megawatt (MW) gas-fired electric power generating station in southern Clark County, Nevada. The facility would be known as the Ivanpah Energy Center, LP (IEC). The Draft Environmental Impact Statement evaluates several potential plant sites, two of which were determined to be reasonable alternatives for development. Construction at either site would require consideration of a natural gas supply pipeline, access roads, process water availability and conveyance, telecommunications, and electrical transmission interconnections to the southern Nevada power grid. The purpose of the proposed project is to provide additional reliable electrical generating capacity within the southwestern United States to aid in meeting near-term and future power needs.

The BLM has a jurisdictional trust responsibility over public lands that would be affected by the project, and because the proposed project is a major federal action, the preparation of an Environmental Impact Statement (EIS) under the Environmental Policy Act (NEPA) of 1969 is required to evaluate potential impacts and alternatives for project planning and environmental protection. Electric power generated at the facility would enter the southern Nevada power grid through the Mead Substation which is operated by Western Area Power Administration (Western). The proposed interconnection will require new installation and modification of Western's equipment at Mead; Western is required to provide NEPA compliance for this subsequent federal action. The BLM and Western have reviewed and approved the information and analyses set forth in this Draft EIS (DEIS).

Analyses associated with the two alternative plant sites that were evaluated in detail address potential impacts and mitigation measures related to construction and operation of the plant and alternatives related to site access, process water pipeline routes, and transmission line routes. Environmental issues addressed include: geology, minerals, seismicity, soils, and mining; groundwater and surface water resources; biological resources; cultural resources; paleontological resources; land use and zoning; rangeland management; recreation; transportation; hazardous materials; visual resources; climate and air quality; noise; socioeconomics; and environmental justice.

Implementation of the Proposed Action or alternatives will result in significant impacts to biological resources. Cultural resources and paleontological resources investigations are ongoing, therefore, a determination of potential impacts to such resources cannot be made. Potential impacts to other resources are expected to be less than significant. If the No-action Alternative were to be selected, the purpose and need of the proposed project would not be met and the availability of additional electrical power generation in the southwestern United States would not be realized.

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
µg/m^3	Micrograms per cubic meter
µPa	Micropascals
ACEC	Areas of critical environmental concern
Afy	Acre-feet per year
AMP	Adaptive Management Program
amsl	Above mean sea level
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
ATV	All-terrain vehicle
BACT	Best available control technology
BITD	Best in the desert
BLM	Bureau of Land Management
bls	Below land surface
B.P.	Before present
BRP	Basin and Range Province
Btu/hr	British thermal units per hour
CAA	Clean Air Act
CCC	Civilian Conservation Corps
CCRFCD	Clark County Regional Flood Control District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CO	Carbon monoxide
COM Plan	Construction, operations, and maintenance plan
CR	County road
CSLC	California State Lands Commission
CTG	Combustion turbine generator
CWA	Clean Water Act
CWA	Civilian Works Administration
DAQM	Clark County Department of Air Quality Management
dBA	Decibels A-weighted
DEIS	Draft environmental impact statement
DOI	Department of the Interior
EA	Environmental assessment
EIS	Environmental impact statement
EPA	Environmental Protection Agency
ERMA	Extensive recreation management area
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FERC	Federal Regulatory Commission

FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act of 1976
HMA	Red Rock Herd Management Area
Hz	Hertz
I–15	Interstate 15
IEC	Ivanpah Energy Center, LP
KOP	Key observation point
KRGT	Kern River Gas Transmission
kV	Kilovolt
LAER	Lowest achievable emission rate
LOS	Level of service
LVVWD	Las Vegas Valley Water District
M2	Industrial zoned
MBTA	Migratory Bird Treaty Act
mg/L	Milligrams per liter
MP	Mile post
mph	Miles per hour
MRAN	Motorcycle Racing Association of Nevada
MSHCP	Multi-species Habitat Conservation Plan
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NCA	Noise Control Act of 1972
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NERC	North American Reliability Council
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NO	Nitric oxide
NO_2	Nitrogen dioxides
NOI	Notice of intent
NO_x	Nitrogen oxides
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
O_3	Ozone
ORV	Off-road vehicle
Pb	Lead
PM_{10}	Particulate matter less than 10 microns in diameter
POD	Plan of Development
PPA	Pollution Prevention Act of 1990
ppm	Parts per million

PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act of 1976
RIBs	Rapid Infiltration Ponds
RMP	Resource Management Plan
ROS	Recreation Opportunity Spectrum
ROW	Right-of-way
RU	Rural open land
RV	Recreational vehicle
SHPO	State Historic Preservation Office
S.N.O.R.E.	Southern Nevada Off-Road Enthusiasts
SCR	Selective catalytic reduction
SFHA	Special flood hazard areas
SNARE	Southern Nevada ATV Racing Enthusiasts
SO_2	Sulfur dioxides
SO_x	Sulfur oxides
SR	State route
STG	Steam turbine generator
T&E	Threatened and Endangered
TDS	Total dissolved solids
UNR	University of Nevada at Reno
UPRR	Union Pacific Railroad
URTD	Upper respiratory tract disease
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VEA	Valley Electric Association
VOC	Volatile organic compound
VRM	Visual resource management
Western	Western Area Power Administration
WPA	Works Progress Administration
WSA	Wilderness Study Area

Disclaimer

National Environmental Policy Act (NEPA) Disclosure Statement
Bureau of Land Management Environmental Impact Statement
Ivanpah Energy Center

The President's Council on Environmental Quality (CEQ) regulations at 40 CFR 1506.5(c) require that consultants preparing an environmental impact statement (EIS) execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for the purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 18026-18038 at questions 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)." 46 FR 18026-18038 at 18031.

In accordance with these requirements, **Parsons** has prepared this EIS on behalf of the Bureau of Land Management and declares no financial or other interest in the outcome of the proposed project.

Certified by:

George R. High, EIS Manager

11 Nov. 2002
Date

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EXECUTIVE SUMMARY
IVANPAH ENERGY CENTER

Ivanpah Energy Center, L.P., a Diamond Generating Corporation Company, a subsidiary of Mitsubishi Corporation proposes to construct and operate a 500 Megawatt (MW) gas-fired electric power generating station in southern Clark County, Nevada. The facility that would be known as the Ivanpah Energy Center, LP, would be located approximately 25 miles south of Las Vegas.

Six potential plant sites within the Ivanpah Valley were initially identified as potentially suitable for development; four sites were eliminated from further consideration due to environmental and engineering constraints. A site that is approximately 2.5 miles southeast of Goodsprings and a site that would be co-located with the Reliant Bighorn Generating Facility in Primm, Nevada were retained for further evaluation.

Ivanpah Energy Center (regardless of plant site location) would operate as a refrigerated air-cooled combined-cycle gas-fired facility with a nominal output of 500 MW. The facility would use two Westinghouse 501FD-60 Hz natural gas-fired combustion turbine generators with heat-recovery steam generators that would capture exhaust heat. A heat recovery system would be used to supply steam to drive a single steam turbine generator. Each of the combustion turbines would be equipped with dry low NO_x combustors and Selective Catalytic Reduction ammonia injection systems to control emission of NO_x. In addition, a Non-selective Catalytic Reduction unit would be used to control emissions of carbon monoxide and volatile organic compounds. Full load output of the facility under expected operating conditions (both combustion turbine generators and the steam turbine generator running) would range from approximately 450 net MW to 540 net MW, depending on ambient air temperature.

Process water requirements for the facility would be minimized through the use of refrigerated air-cooled technology that would reduce requirements from approximately 300 acre feet per year (afy) to 50 afy. Potential impacts to water resources will be further reduced through the use of gray water from the Southern Nevada Correctional Center (SNCC). The project proponent would construct a water treatment plant near the SNCC and treated water would be piped to the power plant site. A well that is owned by the Las Vegas Valley Water District and located near the SNCC has been proposed by the project proponent as a back-up water supply, should gray water flows from the SNCC become curtailed or interrupted.

Proposed Goodsprings Plant Site

The Proposed Goodsprings Plant Site would be located on a 30-acre parcel; an additional 10 acres would be used as a temporary laydown area. Natural gas supply to the plant would be from the Kern River Gas Transmission (KRGT) pipeline which is adjacent to the plant site. Development of the site also would require improvements to the permanent northern access road and temporary southern access road and installation of a telecom-

munications line. The plant site, temporary laydown area, access roads, and telecommunications line would be on Bureau of Land Management (BLM) property.

Primm Plant Site Alternative

The Primm Plant Site Alternative would be co-located on industrial-use private land, with the Reliant Bighorn Generating Facility. Existing access roads and telecommunications corridors would be used; however, a 3.2-mile-long natural gas supply pipeline and a metering station would be required to provide natural gas from the KRGT to the plant site. The pipeline and metering station would be on BLM property.

Water Treatment Plant

Regardless of plant site location (Goodsprings or Primm), a water treatment plant would be constructed on one of two 0.7-acre parcels near the SNCC in Jean. Both parcels are located north of Prison Road on State of Nevada land.

Water Supply Pipeline

A water supply pipeline to the Goodsprings Plant Site would largely parallel Union Pacific Railroad (UPRR) right-of-way (ROW) to a BLM-designated Utility Corridor that would be used to interconnect the power plant to Mead Substation. The pipeline would be co-located within a new transmission line corridor to the vicinity of the Goodsprings Site. Three plant site access options were evaluated to route the pipeline from the transmission line corridor to the plant site. Two routes would extend south of a small mountain near the plant site; one route would cross over the mountain.

Two water supply pipeline routes were evaluated for the Primm Plant Site. One route would extend directly from the water treatment plant near the SNCC to the plant site, parallel to the UPRR ROW. The other route would parallel the UPRR ROW to the previously referenced utility corridor where it would be co-located within a new transmission line corridor to the plant site.

Transmission Line Interconnections

Thirteen alternative routes were initially identified for a single-circuit transmission line from the Goodsprings Plant Site to Mead Substation (Ivanpah-Mead #2). Two alternatives were carried forward for further consideration. A double-circuit line also would be required from the plant site to Table Mountain Substation (Ivanpah-Table Mountain #1 & #2). Lines also would interconnect to the existing Valley Electric Association (VEA) Pahrump-Mead Transmission Line.

Four Goodsprings Plant Site access options were identified to interconnect the previously referenced five circuits to the Ivanpah Energy Center, Mead Substation, Table Mountain Substation, and the existing Pahrump-Mead Transmission Line. One access option would cross over the mountain west of the plant site; two access options would extend all five circuits around or across the southern toe of the mountain. One access option would extend one circuit across the mountain and four circuits across or around the toe of the mountain.

Development of the Primm Plant Site would require construction of a circuit to Mead Substation (Ivanpah-Mead Transmission Line) and a circuit to Table Mountain Substation (Ivanpah-Table Mountain Transmission Line). Although

several potential routes were initially identified, four alternative routes were carried forward for further consideration.

No Action Alternative

Selection of the No Action Alternative would result in a failure to develop new generating capacity in Southern Clark County. Under such circumstances, the region would continue to be reliant on existing and planned generation and the purpose and need for the Ivanpah Energy Center would not be met.

Alternatives and options that were evaluated in detail are summarized in Table ES-1.

Table ES-1. Summary of Alternatives Retained for Further Consideration

Project Component	Proposed Goodsprings Plant Site	Primm Plant Site Alternative
IEC Plant Site Location Alternatives	Alternative E— Proposed Goodsprings Plant Site	Alternative F – Primm Plant Site (co-location with Reliant Bighorn)
Natural Gas Pipeline	Direct connection to plant site. No routing required.	3.2-mile-long pipeline from KRGT and 0.46 acre metering station.
Telecommunications Line	Installation along a 7,200-foot-long corridor from the KRGT Compressor Station to the plant.	Installation along the existing Sprint Communications line in use by Reliant. No routing required
Access Roads	Northern Access (County Road 53Y), 20-foot-wide, paved, 3-foot-wide shoulders.	Access available on paved road through the Bighorn facility.
	Southern Access (County Road 28, existing trail, and County Road 53Y). Trail bladed to 18-foot-width.	
Water Treatment Facility	Use of one of two 0.7-acre parcels north of Prison Road.	
Water Supply Pipeline Route	South from SNCC along the west side of the UPRR ROW to and within BLM-designated Utility Corridor and Ivanpah-Mead Transmission Line #2 corridor.	Parallel to east side of the UPRR ROW to the plant site.
		Parallel to east side of the UPRR ROW to (and within) the Ivanpah-Mead/Ivanpah-Table Mountain Transmission Line corridor.
Water Supply Pipeline Plant Site Access Options	Across the mountain	N/A
	Traversing the southern slope of the mountain, north of Desert Tortoise fence.	
	Parallel to existing trail, around the southern toe of the mountain	
Transmission Line Alternatives	Two alternatives retained for further consideration.	Ivanpah-Mead—Four Alternatives Retained Ivanpah-Table Mountain –Two Alternatives Retained

Project Component	Proposed Goodsprings Plant Site	Primm Plant Site Alternative
Transmission Line Plant Site Access Options	Five circuits across the mountain	N/A
	Five circuits traversing the southern toe of the mountain, north of Desert Tortoise Fence	
	Five circuits parallel to an existing trail, around the toe of the mountain.	
	One circuit across the mountain, four circuits traversing the toe of the mountain	
Structure Type Options	Gray-painted single-pole tubular steel	
	Coreten single-pole tubular steel	
No Action Alternative	No Action Alternative Retained	

Comparative Summary of Impacts

Geology and Soils

Impacts to geology and soils that would be related to construction and operation of the Ivanpah Energy Center would be similar and negligible, regardless of alternative plant site selected. Use of the Goodsprings Site would eliminate mining potential on approximately 42 acres; whereas use of the Primm Site would eliminate mining potential on 9 acres. Erosion potential that would be associated with plant access options would only be associated with development of the Goodsprings Plant Site. Those access options that would cross the mountain west of the Goodsprings Plant Site (Options 1 and 4) would result in greater potential impacts than those that would cross south of the mountain (Options 2 and 3).

Mitigation measures that would be implemented to reduce the severity of erosion include the installation of appropriate drainage structures (i.e., gabions) and regrading and revegetation of disturbed areas. Those that could be taken to reduce impacts to mining operations include modifications to transmission line structure locations, spanning of mining areas, and negotiations with mining operators.

Impacts to geology, soils, and mining are expected to be less than significant, regardless of plant site alternative.

Groundwater and Surface Water

Ivanpah Energy Center (regardless of plant site location) would operate using a dry cooled system and refrigerated input air that would minimize process water requirements. Water that would be needed for plant operations would be acquired from gray water flows from the Southern Nevada Correctional Center.

Groundwater would only be required as a supplement to the use of gray water. A well that is located near the SNCC has been proposed for use by the project proponent, should gray water flows from the SNCC be curtailed.

The use of refrigerated air technology and gray water would reduce groundwater dependence, thus resulting in less than significant impacts to the resource.

Biological Resources

Construction and operation of the Ivanpah Energy Center at the Proposed Goodsprings Plant Site would result in significant impacts to approximately 115 acres of moderate density (Category B) desert tortoise habitat. Approximately 36 acres would be permanently affected during the life of the project; 79 acres would be temporarily affected.

Construction and operation of the Ivanpah Energy Center at the Primm Plant Site would result in significant impacts to approximately 27 acres of moderate density (Category B) desert tortoise habitat. Less than one acre would be permanently affected; 26 acres would be temporary affected.

Construction and operation of the Proposed Goodsprings Plant Site would permanently impact *Penstemon spp.* habitat (primarily due to construction of the northern access road). Additional temporary impacts to the species would result from construction of the southern access road, water supply pipeline installation, and transmission line construction.

Development of the Primm Plant Site Alternative would temporarily impact *Penstemon spp.* habitat, primarily due to transmission line construction. Permanent impacts to the species that would be related to the Primm Plant Site Alternative are not expected.

Construction of transmission lines required to support the Ivanpah Energy Center at the Goodsprings Plant Site would cross approximately 13,000 linear feet of crucial Gambel's quail habitat. Those required for the Primm Plant Site would cross approximately 26,000 linear feet of habitat.

Transmission lines needed for both alternatives would cross approximately 21,000 linear feet of crucial desert tortoise habitat and would be in proximity to desert bighorn sheep habitat.

Impacts to all species would be reduced by using existing roads along established transmission line corridors, minimizing the extent of access road construction, and scheduling to avoid construction during the migratory bird nesting season and desert bighorn sheep lambing season. Land that would be temporarily disturbed would be restored in accordance with BLM-approved restoration plans. Potential impacts to *Penstemon* spp. could be ameliorated by seed collection and post construction reseeding. Impacts to cacti, yucca, and other important plant species would be reduced by transplanting.

Although impacts to the desert tortoise within moderate density areas would be significant, those within low density areas would be less than significant. Impacts to *Penstemon* spp, desert bighorn sheep, and other species of concern would be less than significant.

Cultural and Paleontology

Class I cultural and paleontological data indicate that several sites of potential interest are within the project area. Field investigations will be conducted as part of the project to identify potential impacts and mitigation measures associated with the project.

Land Use and Zoning

The Ivanpah Energy Center, Proposed Goodsprings Plant Site would be constructed on BLM land. Approximately 30 acres would be permanently (during life of the project) used for the facility and an additional 10 acres would be used as a temporary laydown area. Construction of the Primm Plant Site would be on private land. An additional 0.7 acres of State of Nevada land would be used for the water treatment plant, regardless of plant site alternative. Permanent and temporary land use requirements for BLM lands total 336 acres for the Proposed Goodsprings Alternative and 327 acres for the Primm Plant Site Alternative.

The water treatment plant would be located on State of Nevada land that is zoned as rural open space. Construction of the plant would require a special use permit from Clark County.

Construction at the Goodsprings Plant Site would require rezoning of the land from rural open space to heavy industrial use. Variances and waivers would be requested for township/range line avoidance, height requirements, off-site development, county road abandonment, noise limitations, landscaping, and setback from non-industrial use areas.

The Primm Plant Site would be located on private land that is partially zoned for heavy industrial use. Eighty-five acres of the original 166 acres that are leased by Reliant Energy for the Bighorn facility have been zoned M-2 (heavy industrial). Although a portion of the original 85 acres may be available for use by Ivanpah Energy Center at Primm, it is likely that additional lands on the original 166-acre tract would require rezoning for heavy industrial use. Development of the Primm Plant Site would require variances and waivers for height requirements, off-site development, noise limitations, setback from non-industrial use areas, and landscaping.

The Primm Site is currently under lease by Reliant Energy from Primadonna Corporation. According to Reliant Energy (Greesom, 2002), the current lease allows an unspecified amount of additional electrical generation to be constructed on the leased lands; however, contractual arrangements between Reliant Energy and Diamond Generating Corporation would need to be negotiated.

Rangeland Management

Although impacts to rangeland are not expected to be significant, regardless of plant site alternative, those related to the Primm Plant Site Alternative would be slightly greater than those related to the Proposed Goodsprings Plant Site. Potential impacts associated with both alternatives include the potential introduction of noxious weeds; injury to, or loss of livestock during construction; damage to fences, gates, and cattle guards that could occur during construction; and reduced access to water and feed supplies during construction. Mitigation measures would be followed to avoid or reduce the potential for impacts to livestock.

Recreation

Impacts to recreation are not expected to be significant, regardless of plant site, transmission line route, or water supply pipeline route selected. However, they would be slightly greater for the Primm Site Alternative because transmission line construction through recreation-use lands would be more extensive than would be needed to support development and operation of the Proposed Goodsprings Alternative. Regardless of alternative selected, potential impacts related to off-road events and casual users could be reduced by appropriate scheduling and the identification of work site locations.

Transportation

Construction of the Goodsprings Plant Site could result in greater impacts to highway safety than that of the Primm Plant Site, primarily because plant site construction and operation would affect traffic on SR 161. However, due largely to the inclusion of the temporary (south) access road, the level of impacts that would be associated with the Proposed Goodsprings Alternative are not expected to be significant.

Hazardous Materials

Ivanpah Energy Center (regardless of plant site location) would be constructed and operated in a manner that would avoid the release of hazardous and non-hazardous materials. The project proponent has agreed to use aqueous ammonia (concentrations of less than 20 percent), rather than hydrous ammonia. Therefore, impacts associated with hazardous or non-hazardous materials are not expected to be

significant, regardless of alternative selected.

Visual Resources

Construction and operation of either the Goodsprings or the Primm Plant Site are expected to result in weak to moderate visual impacts. The Goodsprings plant site would be screened from most views by intervening topography; the Primm plant site would be partially screened by the Reliant Bighorn Generating Facility. Slightly greater visual impacts would be associated with Goodsprings Plant Site Transmission Line Access Options 1 or 4 than would result from Options 2 or 3 because land disturbance and structures on the mountain west of the plant site would be more readily visible.

Potential impacts associated with new transmission lines would be mitigated through the use of gray-painted structures and non-specular conductor and (to the extent practicable) by paralleling existing transmission lines and structures.

Climate and Air Quality

Construction at the Proposed Goodsprings Site or the Primm Site would generate similar levels of airborne particulates during site clearance and road construction. However, since more site preparation and access road grading would be needed for the Goodsprings Plant Site than would be needed for the Primm Plant Site Alternative, related temporary impacts that would be associated with the Goodsprings Plant Site would be greater than those associated with the Primm Site Alternative.

The Ivanpah Energy Center would use appropriate technology to reduce air emissions. Impacts to air quality within the Ivanpah Valley Air Shed are not expected to be significant, regardless of plant site location.

Noise

Clark County noise standards are not expected to be violated, regardless of plant site selected and impacts to area residents are expected to be less than significant. However, due to the proximity of the site to sensitive receptors (2.3 miles), it is likely that temporary noise impacts related to construction of the Proposed Goodsprings Plant Site would be slightly greater than those related to the Primm Plant Site Alternative.

Socioeconomics/Environmental Justice

Construction and operation of the Ivanpah Energy Center would result in similar impacts to area residents and Clark County, regardless of plant site location. Environmental Justice issues are not present at either alternative or their auxiliary components. Impacts to socio-economics or Environmental Justice are not expected to be significant.

Transmission Line Engineering and Cost Considerations

An engineering analysis was provided to compare reliability, constructability, cost, and maintenance factors that are related to transmission lines required to serve the Proposed Goodsprings Plant Site and those required to serve the Primm Site Alternative. Results of the analysis indicate that transmission lines that would be needed to support the Goodsprings Plant Site would be somewhat more reliable than those associated with the Primm Plant Site. Construction of the Ivanpah Energy Center at the Primm Plant Site would be less difficult than that of the Goodsprings Plant

Site, primarily due to the presence of existing access roads. However, total line lengths associated with the Goodsprings Plant Site would be shorter than those of the Primm Plant Site.

Construction of transmission lines to support the Primm Plant Site Alternative would cost approximately 12 percent more than would be needed to support the Goodsprings Plant Site.

From a line maintenance perspective, the Proposed Goodsprings Plant Site is somewhat better due to the fact that all new lines would be within 1 mile of existing Valley Electric Association line corridors. Construction of the Ivanpah Energy Center at the Primm Site would introduce approximately 7.9 miles of new VEA line corridors. However, regardless of plant site location, the use of steel pole construction would minimize maintenance requirements.

Table ES-2. Areas of Disturbance by Project Component – Proposed Goodsprings Plant Site

Goodsprings Site – includes Option 2 across toe of mountain and line to Table Mountain						
	BLM ROW	Land Disturbance Within BLM ROW		Land Disturbance Outside of BLM ROW		Private and State Lands
		Permanent	Temporary	Permanent	Temporary	
Ivanpah Energy Center						
Plant Site (N-75493)	30.0	30.0				
Temporary Laydown Area (N-75493)	10.0		10.0			
Natural Gas Supply Pipeline (N-75471)	Negligible	Negligible	Negligible			
Telecommunications Line (N-75895) [1]	1.7		0.8			
Access Roads (N-75493)						
Northern Access Road (County Road 53Y) [2]				2.7		
Southern Access Road [3]					2.6	
Water Treatment Plant (no BLM permit required)	State of Nevada Land					0.7
Water Supply Pipeline (N-75475)						
Parallel to UPRR ROW and Co-located with Transmission Corridor (~57,560 linear ft)	13.2 [4]		52.9 [5]			
Ivanpah-Mead #2, Ivanpah-Table Mountain #1 & #2, and Pahrump-Mead Interconnections (N-75471 and N-75472)						
Approx. Line Length (~251,000 linear ft)						
Pole Sites (380)		<0.1				
Pole Work Areas (100x200 each)			174.5			
P&T Sites			2.8 [6]		27.6 [7]	
New Access Roads		4.8 [8]				
Spur Roads		4.1 [9]			5.2 [10]	
OPGW	69.2 [11]					
Temp. Laydown Areas (total)					18.0	
Total Proposed Goodsprings Site		**38.9**	**241.0**	**2.7**	**53.4**	**0.7**

[1] Total length - 7,200 linear ft -- 10 ft wide permanent ROW, 25 ft temporary disturbance along 1,400 linear feet.
[2] 7,500 linear ft – increase from 10 ft wide to 26 ft wide, pave 20 ft. width.
[3] 14,000 linear ft – increase from 10 ft side to 18 ft wide.
[4] 10 ft wide permanent ROW, partially within project transmission line corridors,
[5] 40 ft wide temporary disturbance
[6] 4 sites within ROW, (100x300 each)
[7] 40 sites outside of ROW, (100x300 each)
[8] 5,000 linear feet x 18 ft, from Table Mountain Sub. to Mead Sub. (2.1 ac), plus 6,500 linear feet x 18 ft, across toe of mountain (2.7 ac)
[9] 10,000 linear feet (spur roads) x 18 ft (4.1 ac)
[10] 12,500 linear feet (spur roads) x 18 ft from Table Mountain Sub. to Mead Sub. (5.2 ac)
[11] OPGW = 12 ft wide throughout length of ROW
Note: Linear feet and acreages among transmission line alternatives and plant access options differ slightly.

Table ES-3. Areas of Disturbance by Project Component – Primm Plant Site Alternative

Primm Site – Includes to Table Mountain Circuit						
	BLM ROW	Land Disturbance Within BLM ROW		Land Disturbance Outside of BLM ROW		Private and State Lands
		Permanent	Temporary	Permanent	Temporary	
Ivanpah Energy Center						
Plant Site (N-75493)	Private Industrial Land					30.0
Temporary Laydown Area (N-75493)	Private Industrial Land					10.0
Natural Gas Supply Pipeline (N-75471)	4.4 (1)	0.5 (2)	19.4 (3)			
Telecommunications Line (N-75895)	None required					
Access Roads (N-75493)	None required					
Water Treatment Plant (no BLM permit required)	State of Nevada Land					0.7
Water Supply Pipeline (N-75475)						
Parallel to UPRR ROW (~57,800 linear ft)	13.3 (4)		53.1 (5)			
Ivanpah-Mead and Ivanpah-Table Mountain Circuits (N-75471 and N-75472)						
Approx. Line Length (~285,900 linear ft)						
Pole Sites (410)		<0.1				
Pole Work Areas (100x200 each)			188.3			
P&T Sites			3.4(6)		30.3(7)	
New Access Roads		4.2(8)				
Spur Roads		4.1(9)			5.2(10)	
OPGW	78.8(11)					
Temp. Laydown Areas (total)					18.0	
Total Primm Site Alternative		**8.8**	**264.2**	**- 0 -**	**53.5**	**40.7**

[1] 0.5 ac metering station plus 3.9 ac permanent pipeline ROW (10 ft width)
[2] 100 x 200 ft metering station
[3] 16,900 linear ft pipeline, 50 ft wide temporary disturbance
[4] 10 ft wide permanent ROW
[5] 40 ft wide temporary disturbance (an alternative using transmission line corridors would result in 66 acres of disturbance).
[6] 5 sites within ROW, (100x300 each)
[7] 44 sites outside of ROW, (100x300 each)
[8] 5,000 linear feet x 18 ft, from Table Mountain Sub. to Mead Sub.(2.1 ac), plus 5,000 linear feet x 18 ft from IEC to the north (2.1 ac)
[9] 10,000 linear ft (spur roads) x 18 ft (4.1 ac)
[10] 12,500 linear feet x 18 ft from Table Mountain Sub. to Mead Sub. (5.2 ac)
[11] OPGW = 12 ft wide throughout length of ROW
Note: Linear feet and acreages among transmission line and water supply pipeline alternatives options differ slightly.

SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Construction and operation of the Ivanpah Energy Center would result in significant unavoidable impacts to the desert tortoise. Construction of the Proposed Goodsprings Plant Site, the telecommunications line, access roads, water supply pipeline, and transmission lines would result in the permanent loss of approximately 36 acres of Category B moderate density desert tortoise habitat. An additional 79 acres would be significantly affected during construction and prior to completion of restoration practices.

Construction and operation of the Ivanpah Energy Center at the Primm Plant Site would result in significant impacts due to the permanent loss of less than one acre of Category B moderate density habitat. Additional significant impacts would result from temporary impacts to approximately 27 acres of Category B moderate density habitat.

The decision to identify impacts within Category B habitat as "significant" was based on species density and a higher potential for project actions to affect greater numbers of desert tortoise than would be affected by actions in lower density areas. Species density within the category typically exceed 45 per square mile, whereas those within Category C density areas are below 45 per square mile. Category B lands, as designated by the BLM (1997), include the area west of I-15 from the vicinity of Jean to the southern limit of the Desert Tortoise Translocation Area and lands east and west of the interstate north of Jean.

Results of biological investigations that were carried out for the Ivanpah Energy Center EIS confirm relatively high densities of the species to be present along the northern and southern access roads to the plant site, land surrounding the plant site, and along most transmission line corridors west of I-15. Additional information, contained in the Draft Biological Assessment indicates that moderate (45 – 90 per square mile) to very high (140+ per square mile) densities were found to be present within all but one area west of I-15. Densities east of the interstate, including Eldorado Valley, ranged from very low (0 – 10 per square mile) to low (10 – 45 per square mile) in all but one area.

Project activities within moderate to high density desert tortoise habitat were considered to result in significant impacts to the species because actions within those areas (Category B) are more likely to directly or indirectly affect greater numbers of the species than similar actions within very low to low density habitat. The range of impacts include incidental take during construction or operation due to crushing or similar direct action, habitat fragmentation, introduction of noxious or other undesirable plant species, soil compaction and similar habitat degradation, and the potential for increased public access to area lands.

Direct long-term habitat loss associated with construction and operation of the Ivanpah Energy Center and north access road at the Goodsprings Plant Site and potential increased public access to the area south of the plant site represent significant unavoidable impacts that cannot be fully mitigated. Short-term and long-

term unavoidable impacts that can be (at least partially) mitigated include construction of the south access road, land disturbance due to water supply pipeline and telecommunications line installation, and transmission line installation. The range of mitigation measures include site restoration and revegetation and noxious weed controls.

CUMULATIVE IMPACTS

Ivanpah and Eldorado valleys have been previously impacted by a variety of activities ranging from the construction and continued use of major highways and secondary roads, unimproved roads and trails, pipelines, the Union Pacific Railroad, casinos and retail businesses, transmission lines and substations, and other facilities developed around Jean and Primm. Development within the area has resulted in the loss of natural resources and the transition of both valleys from their original undisturbed natural setting to one that, in many locations, represents an industrial or commercial setting. Similar changes have taken place in limited areas of the McCullough Range where roads and trails provide access through narrow passes that also are crossed by high voltage transmission lines.

Reasonable and foreseeable future actions that could contribute to cumulative impacts within Ivanpah and Eldorado valleys that would be related to the proposed action range from administrative actions through new facilities construction.

Administrative actions associated with implementation of the Clark County Conservation of Public Lands and Natural Resources Act of 2002 are likely to have far reaching ramifications on land uses within in Ivanpah Valley. Major new facilities within the valley, including construction of the Ivanpah Valley Airport and a water supply pipeline from Las Vegas would directly affect land uses within the central portion of the valley and would contribute to secondary development elsewhere.

Increased development is likely to result in continued loss of habitat and mining and recreational opportunities. Rural characteristics of Ivanpah Valley and the communities of Goodsprings and Sandy Valley are likely to be changed over time to a more urbanized setting. As urbanization increases, traffic congestion and noise will increase, and visual aesthetics and air quality will degrade. Although many residents of Goodsprings and Sandy Valley view increased development as a degradation of their lifestyle, associated benefits are likely to result from improved public services.

SHORT-TERM USES OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY

Construction of the Ivanpah Energy Center at either the Goodsprings or the Primm location would commit the temporary use of 294 to 317 acres of federal land during construction. Long-term (permanent for the life of the project) commitments of federal land would range from nine acres (Primm Plant Site Alternative) to 42 acres (Proposed Goodsprings Plant Site Alternative). Lands that would be temporarily used during construction would represent a short-term use of the environment because they would be restored and returned to the BLM following restoration.

Short-term uses of the environment also would result in a variety of impacts to the

physical, biological, and human environment; however, such impacts would be offset during the life of the project through the generation of reliable power that would be available to the competitive market.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction and operation of the Ivanpah Energy Center (regardless of plant site location) and related facilities would require the commitment of a variety of resources that cannot be replaced, restored, or recovered. Project construction also would use a variety of resources that, after decommissioning of the facility, could be restored and returned for use in the future.

SECTION 1
IVANPAH ENERGY CENTER
ENVIRONMENTAL IMPACT STATEMENT

1.1 INTRODUCTION

Ivanpah Energy Center, L.P., a Diamond Generating Corporation Company, a subsidiary of Mitsubishi Corporation proposes to construct and operate a 500 Megawatt (MW) gas-fired electric power generating station in southern Clark County, Nevada. The facility, that would be known as the Ivanpah Energy Center, LP (IEC), would be located approximately 25 miles south of Las Vegas. The Draft Environmental Impact Statement evaluates several potential plant sites, two of which were determined to be reasonable alternatives for development. Analyses associated with the two sites that were evaluated in detail address potential issues and mitigation measures related to construction and operation of the plant, natural gas supply pipeline, telecommunications line, plant access, transmission interconnection, and process water supply. Legal descriptions of proposed ROW authorizations are located in Appendix A.

1.2 PROJECT OVERVIEW

Natural gas would be used to fuel two gas turbine generators. The gas supply would be provided to the plant site from the Kern River Gas Transmission (KRGT) pipeline. The natural gas supply pipeline would be constructed, owned, and operated by KRGT.

Electric power generated at the facility would enter the southern Nevada power grid through a new transmission line that would connect to the Mead Substation in Eldorado Valley and the proposed Table Mountain Substation, near Goodsprings.

Mead Substation is operated by Western Area Power Administration (Western). The proposed interconnection will require new installation and modification of Western's equipment at Mead and Western is required to provide NEPA compliance for this subsequent federal action.

Approximately 50 acre-feet-per year of water would be required to operate the Ivanpah Energy Center. The majority of water would originate as gray water from the Southern Nevada Correctional Center, east of Jean, Nevada. Additional water, if needed for backup, as proposed by the project proponent, would be provided through a well owned and operated by the Las Vegas Valley Water District.

The Ivanpah Energy Center would be constructed during a 22-month period. The plant would be constructed to operate continuously, except during semi-annual maintenance shutdowns, over at least a 30-year operational life. Power generated from the facility would be sold to the commercial power markets in Nevada, California, and Arizona.

Where would power be sold?

Additional information regarding the proposed action and alternatives is provided in Section 3 of this document.

1.3 PURPOSE AND NEED

Ivanpah Energy Center would provide a nominal 500 MW of power to the southern Nevada power grid. The facility would operate on a nearly full-time basis, with shutdown periods that would be limited to scheduled maintenance periods.

The need for additional power.

Demand for electric power in the western and southwestern United States exceeds capacity and continues to increase. Peak demand energy requirements for the Arizona-New Mexico-southern Nevada Power Area (Arizona, most of New Mexico, westernmost Texas, southern Nevada, and part of southeastern California) are projected to grow at an annual compound rate of 3.3 percent over the period 2000 to 2010; annual energy requirements for the period are expected to increase at a compound rate of 3.4 percent (North American Reliability Council [NERC], 2001). Peak demand and annual energy requirements for the California-Mexico Power area, which includes the northern portion of Baja California and Mexico, is predicted to grow at compound rates of 2.6 and 2.8 percent, respectively during the period 2001 through 2010.

The California energy crisis has resulted from three interrelated problems consisting of (1) precipitous increase in wholesale electricity prices, (2) intermittent power shortages during peak demand periods, and (3) the deterioration of the financial stability of California's three major investor-owned utilities – Pacific Gas and Electric, Southern California Edison, and San Diego Gas and Electric (U.S. Department of Energy, 2002).

Wholesale prices began increasing in January 2000 and by June and July of the year, electricity prices increased an average of 270 percent over prices during the same period in 1999. By December of the year, wholesale prices were more than 11 times higher than the national average.

During recent years, the California-Mexico Power Area has been experiencing rolling blackouts due to a shortage of generated power in the area. A severe heat wave in California in 1998 resulted in numerous curtailments of service to interruptible customers and additional load curtailments were experienced in California in 2000. The incidence of declared Stage 1 and Stage 2 power emergencies in California increased from less than 10 in 1998 and 1999 to more than 50 (Stage 1) and more than 30 (Stage 2) in 2000. Stage 1 and 2 declared power emergencies exceeded 60 during 2001 and more than 30 Stage 3 power emergencies were declared during the year.

Stage 1, 2, and 3 emergencies are based on the availability of power reserves, following power demand. Stage 1 emergencies are defined by the Department of Energy (2002) as declared when the operating reserve is forecast to be less than minimum levels, after utilizing available resources. Stage 2 emergencies are declared when it is clear that operating reserves shortfalls are unavoidable or when the operating reserve is expected to be less than 5 percent, after dispatching all available resources. Stage 3 emergencies are declared when an operating reserve is expected to be less than 1.5 percent, after dispatching all available resources.

Financial problems that have been experienced by the three major California investor-owned utilities forced Pacific Gas and Electric to file for bankruptcy

protection under Chapter 11 of the U.S. Bankruptcy Code as a result of unrecovered costs. Similar unrecovered costs have been incurred by Southern California Edison and San Diego Gas and Electric, which amounted to $2.6 billion and $447 million, respectively by December 2000. Nevada Power Company is currently undergoing financial difficulties and is proposing substantial customer rate increases to avoid bankruptcy. An analysis of power generation and power usage in Nevada, Arizona, and California during 1998 (most recent data available) indicate that generation in Nevada and Arizona exceeded demands.

Retail sales exceeded generation in California by more than 111 million megawatt hours.

Megawatt hours, 1998			
	Generation	Retail Sales	Balance
Nevada	26,552,567	25,037,075	1,515,492
Arizona	81,299,241	55,843,277	25,455,964
California	114,926,213	226,395,687	(111,469,474)
		Balance – Three States	(84,498,018)

Source: U.S. Department of Energy, 2002.

Data compiled from various state sources indicate that approximately 106 power generation projects (natural gas, coal, geothermal, and wind) have been proposed and approximately 45 power generation projects have been denied in Nevada, Arizona, and California. Data also indicate that eight projects in Arizona, 24 projects in California, and one project in Nevada were completed during 2001 (California Energy Commission 2002). More recent data compiled for the State of Nevada (September 2002) indicate that nine power generation projects are under consideration. One project is expected to be on-line during 2002, four projects are expected to be on-line during 2003, and four are expected to be on-line during 2004, 2005, or 2006. Nine projects proposed in the state of Nevada have been delayed (Public Utilities Commission of Nevada 2002). A construction schedule has not been identified for the nine delayed projects.

Proposed projects, denied projects, and completed projects for the three-state area and recently compiled data of proposed projects in Nevada are listed in Appendix B.

Development of the Ivanpah Energy Center would aid in addressing energy demands in the region and strengthen the electrical utility grid in southern Clark County. The facility also would serve as a new source of power, thus reducing the level of dependence on existing power generation facilities.

Western Area Power Administration (Western), as the operator of the Mead Substation, is responsible for responding to the project proponent's request for interconnection of the proposed power

plant and ancillary 230 kV transmission lines to Western's existing facilities at Mead Substation. Western's purpose is to ensure that the applicant meets Western's interconnection requirements and to meet the intent of the requirements of Federal Energy Regulatory Commission (FERC) Order No. 888 in providing any necessary transmission service to the project proponent consistent with statutory obligations, without degrading reliability or service to customers.

1.4 BLM POLICIES, PLANS, AND PROGRAMS

The development of energy resources is an identified part of the BLM management program under the authority of the Federal Land Policy and Management Act (FLPMA) of 1976 (43 CFR 1600) and all BLM land uses in southern Nevada are managed under the Las Vegas Resource Management Plan (RMP) (BLM, 1998), as mandated under FLPMA. The RMP was developed through the NEPA process and allows for the use of public lands under a multiple-use/sustained-yield philosophy. The RMP consists of a "combination of management directions, allocations, and guidelines that will direct where actions may occur, the resource conditions to be maintained, and use limitations required to meet management directions." The RMP replaces the Clark County Management Framework Plan (BLM, 1983) and is the primary planning document that governs development of the Proposed Action. Rights-of-way and temporary use permits that would be issued by the BLM would be in accordance with FLPMA, as amended (43 USC 1761), 43 CFR 2800, subsequent 2800 Manuals, Handbook 2801-1, and other guidance instructions.

The proposed action conforms with applicable federal authorizations, permits, and regulations that are listed in Table 1-1, as well as objectives and directives stated in the Las Vegas RMP. The plan addresses: land tenure, desert tortoise protection, mineral availability, off-road vehicle use, special management areas, Areas of Critical Environmental Concern, Minerals management after Congressional Designation of Wilderness Areas, and utility corridors.

The plant, natural gas supply pipeline, water supply pipeline, and the transmission lines will occupy or cross lands primarily managed by the Bureau of Land Management which are maintained primarily for recreation, conservation, and mining.

1.5 AUTHORIZING ACTIONS

The proposed action would be subject to federal, state, and county permits that range from requirements under the National Environmental Policy Act (NEPA), compliance with various resource protection regulations, compliance with Clark County regulations, and other related regulations. Applicable federal authorizations, permits, and regulations that would be required for the proposed action are listed in Table 1-1; regulatory permits and reviews required for the proposed action are listed in Table 1-2.

Table 1-1 Applicable Federal Authorizations, Permits, and Regulations

Law	Record
National Environmental Policy Act (NEPA)	42 USC 4321 *et seq.*
Council on Environmental Quality (CEQ) general regulations implementing NEPA	40 CFR Parts 1500-1508
Department of the Interior's (DOI) Implementing Procedures and Proposed Revision (August 28, 2000, Federal Register)	516 DM 1-7
Bureau of Land Management's (BLM) NEPA Handbook	H-1790-1 (1988)
National Historic Preservation Act (NHPA) and regulations implementing NHPA	16 USC 470 *et seq.* 36 USC 3001
Archaeological Resources Protection Act, as amended (ARPA)	16 USC 470aa *et seq.*
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)	25 USC 3001
Clean Air Act, as amended (CAA)	42 USC 7401 *et seq.*
Clean Water Act, as amended (CWA)	33 USC 1251 *et seq.*
Endangered Species Act of 1973 (ESA)	16 USC 1531 *et seq.*
Noise Control Act of 1972, as amended (NCA)	42 USC 4901 et seq.
Pollution Prevention Act of 1990 (PPA)	42 USC 13101 et seq. (1970)
Migratory Bird Treaty Act (Migratory Bird Guidance)	16 USC 703-711 Executive Order January 1, 2001
NEPA, Protection and Enhancement of Environmental Quality	Executive Order 11512
National Historic Preservation	Executive Order 11593
Floodplain Management	Executive Order 11988
Protection of Wetlands	Executive Order 11990
Federal Compliance with Pollution Control Standards	Executive Order 12088
Environmental Justice	Executive Order 12898
Indian Sacred Sites	Executive Order 13007
Consultation and Coordination with Indian Tribal Governments	Executive Order 13084
Invasive Species	Executive Order 13112
Federal Land Policy and Management Act of 1976 (FLPMA)	43 USC 1701 et seq.
BLM Right-of-Way regulations	43 CFR 2800
Taylor Grazing Act of 1934	43 USC 315

Table 1-2 Regulatory Permits and Reviews Required for the Proposed Action

Agency	Permit/Approval
Federal	
U.S. Department of the Interior, Bureau of Land Management (BLM)	Temporary Use Permit for transmission lines, access roads, gas pipelines, telephone connections, and other ancillary approvals. Right-of-Way Grants/Amendments Las Vegas Field Office Resource Management Plan
Western Area Power Administration	10 CFR 1021 10 CFR 1022
Federal Aviation Administration Nellis Air Force Base, Nevada	49 USC 1501; 14 CFR 77 Structure location and height obstruction analysis and permitting: "No Hazard Declaration" required.
Federal Highway Administration	23 CFR 1.23 and 1.27 USC Sections 116, 123, 315 (23 CFR 645, Subpart B), 23 CFR 77 Construction, operation, and abandonment of transmission lines across or within highway rights-of-way: Permit to Cross Federal Aid Highway
U.S. Fish and Wildlife Service	Endangered Species Act Section 7 Consultation and Biological Opinion
U.S. Army Corps of Engineers	Section 404/Section 10 Permit
U.S. Environmental Protection Agency Region IX	401 Water Quality Certification 402 National Pollutant Discharge Elimination System General Storm Water Permit for Construction
State	
State of Nevada Historic Preservation Office	Section 106 review and concurrence; State Historic Preservation Act for Tribal and BLM lands
Nevada Division of Wildlife Region 3	Project Review: Wildlife and Habitat Consultation for disturbance on BLM land
Public Utility Commission of Nevada	Utility Environmental Protection Act
Nevada Department of Transportation	NRS 408.423 Encroachment into State Highway rights-of-way; ROW Occupancy Permits
Nevada Division of Forestry	NRS 527.060-120 Protection of Christmas Trees, Cacti and Yucca
Nevada State Engineer	Secondary Water Right Permit
Nevada Department of Environmental Protection	Authorization to Discharge Permit Reclaimed Water Use Permit 401 Water Quality Certification 402 National Pollutant Discharge Elimination System General Storm Water Permit for Construction
County	
Clark County Comprehensive Planning	Collection of habitat remuneration fees for disturbed private and public land

Agency	Permit/Approval
Clark County Regional Flood Control District (CCRFSD)	Check of Federal Emergency Management Agency maps and CCRFCD plan for transmission lines
Clark County Board of Commissioners	Clark County Zoning Ordinance Title 30, 30.32.170 Dust Control Plan
Clark County Department of Air Quality Management (DAQM)	Authority to Construct Certificate Dust Control Permit for construction. Grading Permit for construction.
Clark County Building Department	Title 30, 30.32.050 Receipt for payment of Desert Tortoise mitigation fee
Clark County Building Department	Title 22, 22.02.120 Permit for temporary structures
Clark County Building Department	Title 30, 30.32.030 Building permit for permanent structures
Clark County Department of Aviation	Title 20, Chapter 20.13.030 Consultation on "No Hazard Declaration" and conformance with plans for Ivanpah Airport
County Fire Marshall	Airport Clearance: Hazardous Materials Management Plan
County Fire Marshall	Emergency Response Plan
Other	
Union Pacific Railroad	Occupancy Permit for Railroad Right-of-Way

1.6 ENVIRONMENTAL IMPACT STATEMENT ORGANIZATION AND APPROACH

The Draft Environmental Impact Statement (DEIS) is structured to:

- identify and address issues and concerns of the public and agencies;
- identify reasonable and feasible project alternatives;
- provide a balanced analysis of each project alternative;
- evaluate methods to avoid adverse impacts; and
- identify measures that can be taken to reduce the severity of impacts that cannot be fully avoided.

A considerable amount of baseline data that were used to prepare the Ivanpah Energy Center EIS was extracted from the Table Mountain Wind Generating Facility Draft EIS that was published in January 2002 by PBS&J and from the Reliant Bighorn Environmental Assessment (EA) that was published in July 2001 by URS Corporation. The Project Manager and Project Coordinator for the Ivanpah Energy Center EIS served in similar roles for the Reliant Bighorn EA.

The contents of the DEIS are organized as follows:

Chapter 2 - Public Scoping
Provides a summary of comments received during the scoping meetings as well as those expressed by the public, special interest groups, and agencies during other meetings.

Chapter 3 - Description of Project Alternatives

Provides a detailed description of the proposed action and reasonable alternatives to the proposed action. The following project components are discussed:

- Ivanpah Energy Center (including alternative site locations);
- site access roads (permanent and temporary);
- natural gas supply pipeline route;
- telecommunications line;
- water treatment plant;
- water supply sources and pipeline routes;
- transmission line interconnections and routes, and
- No Action Alternative.

Chapter 4 - Affected Environment Existing conditions within the geographic area that could be affected by construction, operation, or maintenance of the project.

Chapter 5 - Environmental Consequences Adverse and beneficial impacts associated with the proposed project and project components. Mitigation measures are included to ameliorate the severity of impacts, as appropriate.

Chapter 6 - Summary of Impacts of Alternatives

Chapter 7 - References and Literature Cited

Chapter 8 - List of Preparers and Reviewers

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Volume 2- Appendices

Throughout the document, comments received during scoping have been included in "drop box" format to link the comments to relevant subjects addressed in the DEIS.

SECTION 2
PUBLIC SCOPING

2.1 INTRODUCTION

The cornerstone of the National Environmental Policy Act (NEPA) is full public disclosure and open public participation in the decision making process; therefore, lead agencies must provide sufficient notification and opportunity for public involvement to take place during the preparation of an Environmental Impact Statement (EIS). Throughout the process, lead agencies must notify the public of all meetings, hearings, and the availability of documentation and information associated with the project.

The initial step in the EIS process is to notify the public and other government agencies of the lead agency's intent to prepare an EIS by publishing a Notice of Intent (NOI). Following publication of the NOI, the scoping process begins. Public scoping allows the public and interested parties the opportunity to express their concerns about the proposed action and to identify issues to be addressed in the EIS. Comments are compiled in a public scoping document as part of the official Administrative Record, which is available to the public. Once the environmental analysis is complete, a Draft EIS is prepared for public review and comment. During the 60-day public review period, formal hearings are conducted to receive public comment on the draft EIS. Public comments are compiled, evaluated; then responses are prepared and incorporated into the Final EIS.

2.2 NOTIFICATION

The Bureau of Land Management (BLM) prepared and published a NOI announcing their intent to prepare an EIS for the proposed Ivanpah Energy Center (IEC) project on February 15, 2002 in the 2002 *Federal Register*, Vol. 67, Number 32. The NOI included a summary of the proposed project; the locations, dates, and times of public scoping meetings; and BLM contact information. Additionally, the NOI was published weekly in the *Las Vegas Review-Journal* during three consecutive weeks on February 18, 2002, February 25, 2002, and March 4, 2002. The process of notification also included distribution of the NOI to numerous federal, state, and county agencies, city officials, and various interested parties. Table 2-1 lists the government agencies and interested parties notified. Copies of the NOI and the NOI distribution list can be found in the IEC Public Scoping Document.

Table 2-1 Notice Of Intent Distribution List

Federal Agencies	
U.S. Environmental Protection Agency Office of Environmental Review	
U.S. Environmental Protection Agency Region IX, Cross Media Division	
U.S. Department of the Interior Office of Environmental Policy and Compliance, Washington, D.C.	
U.S. Department of the Interior, Office of Environmental Policy and Compliance, Denver, CO	
U.S. Department of the Interior, Bureau of Land Management, Washington, D.C.	
U.S. Department of the Interior, Bureau of Reclamation, Washington, D.C.	
Department of the Interior, Minerals Management Service	
Department of the Interior, National Park Service	
Department of the Interior, U.S. Geological Survey	
Federal Aviation Association	
Department of the Interior, Bureau of Land Management, Nevada State Office	
Department of the Interior, Bureau of Land Management, Idaho State Office	
Department of the Interior, Bureau of Land Management, Las Vegas Field Office	
Department of the Interior, Fish and Wildlife Service	
Department of the Interior, Fish and Wildlife Service, Las Vegas	
Department of Agriculture, National Resource Conservation Service	
U.S. Department of the Interior, Fish and Wildlife Service, Desert NWR Complex	
U.S. Department of Energy, Western Area Power Administration	
U.S. Department of Energy, Division of NEPA Affairs	
U.S. Department of Defense, U.S. Air Force	
U.S. Department of Defense U.S. Air Force, HQ-USAF-LEEV, Environmental Division	
U.S. Department of Defense, Corps of Army Engineers	
U.S. Department of the Interior, Bureau of Mines	
U.S. Department of the Interior, Bureau of Indian Affairs, Southern Paiute Field Station	
U.S. Department of the Interior, Bureau of Indian Affairs, Western Regional Office	
U.S. Forest Service, Toyiabe National Forest	
State of Nevada	
Division of Historic Preservation and Archeology	Nevada Division of Forestry
Nevada State Clearinghouse	Nevada Division of Wildlife
Clark County	
Clark County Dept. of Comprehensive Planning	Clark County Commissioners
Clark County Department of Aviation	Clark County Rural Towns Liaison

City of Las Vegas	
Honorable Oscar Goodman, Mayor	City of Las Vegas, Planning and Development
City of Las Vegas, Council Chambers	
Other Interested Parties	
Desert Tortoise Council	Las Vegas Valley Water District
Nevada Power Company	Valley Electric Association
Southwest Gas Company	Kern River Gas Transmission Pipeline Company
Sierra Club	Las Vegas Review Journal
Sagebrush News	
RAC (Resource Advisory Committee)	
Mr. Mark N. Ioli	Ms. Marta Agee
Mr. Jerry Helton	Mr. Bob Maichle
Mr. Patrick John Chicas	Ms. Billie Young
Mr. John Hiatt	Dr. Steve Parker
Sagebrush News	Mr. Maurice Frank-Churchill
Mr. Steve Mellington	Ms. Thalia Dondero
Locations of U.S. Post Offices Postings	
Downtown Station Post Office, Las Vegas, NV	Blue Diamond Post Office, Blue Diamond, NV
Henderson Main Post Office, Henderson, NV	James C. Brown Jr. Post Office, Las Vegas, NV
Paradise Valley Post Office, Las Vegas, NV	Summerlin Station Post Office, Las Vegas, NV
Jean Post Office	Goodsprings Post Office
Sandy Valley Post Office	

2.3 PUBLIC SCOPING

The purpose of public scoping is to identify the action, alternatives, and impacts to be addressed in the EIS. While the scoping process is ongoing throughout the EIS process, public scoping meetings provide the public and interested parties an opportunity to express their concerns about the proposed project. Public comments received during the scoping meetings are compiled and evaluated to identify issues of concern. Three official public scoping meetings were held for the IEC EIS and included a presentation describing the proposed project (Goodsprings Plant Site), an explanation of the NEPA process, followed by an opportunity for attendees to ask questions. Public comment forms also were available for the public to complete and submit to BLM. Meeting place, time, and attendance of the three IEC public scoping meetings are shown in Table 2-2.

Table 2-2 Scoping Meeting Sites and Attendance

Meeting Locations	Date/Time	Number of Attendees
Community Center 375 West San Pedro Ave. Goodsprings, NV	Tuesday, March 5, 2002 7:00 p.m. – 9:00 p.m.	9
Clark County Government Center Room ODC #3 500 Grand Central Parkway Las Vegas, NV	Wednesday, March 6, 2002 7:00 p.m. – 9:00 p.m.	22
Community Center West Quartz Avenue Sandy Valley, NV	Thursday, March 7, 2002 7:00 p.m. – 9:00 p.m.	17

In addition to public scoping meetings, federal and state agencies that have the authority or specialization regarding an environmental impact that could potentially occur as a result of the proposed project were contacted. Table 2-3 identifies government agencies notified in writing of the proposed IEC project.

Table 2-3 Contacts with Agencies

Bureau of Land Management 4701 North Torrey Pines Drive Las Vegas, NV 89130-2301	U.S. Fish and Wildlife Services 4701 North Torrey Pines Drive Las Vegas, NV 89130-2301
Nevada Department of Wildlife 4747 Vegas Drive Las Vegas, NV 89108	Nevada Division of Forestry 4747 West Vegas Drive Las Vegas, NV 89108
Nevada Natural Heritage Program 1550 E. College Parkway, Suite 145 Carson City, NV 89706-7921	U.S. Corps of Engineers 321 N. Mall Drive, Suite L-101 St. George, Utah 84790-7314

During the scoping process, several groups of individuals with special interest in the proposed IEC project were identified. Table 2-4 lists the special interest groups contacted.

Table 2-4 Contacts with Special Interest Groups

Special Interest Group	Meeting Date
Goodsprings Town Board	February 12, 2002
Goodsprings Town Board	March 28, 2002
Clark County Fire Department	April 11, 2002
City of Boulder City	April 30,2002
Quality Earth Materials	May 17, 2002
Fraternity of the Desert Bighorn Sheep	May 28, 2002
Clark County Multi-Species Habitat Conservation Plan Implementation and Monitoring Committee	June 26, 2002

As part of the notification process, BLM contacted Tribes by letter regarding the proposed project. The Tribes were encouraged to provide information concerning cultural and traditional resources within the project area. Table 2-5 lists the Tribes contacted; a copy of the letters are included in the Scoping Document as part of the Administrative Record.

Table 2-5 Contacts with Tribes

Las Vegas Paiute Tribe	Moapa Paiute Tribe
Pahrump Paiute Tribe	Chemehuevi Indian Tribe
Fort Mojave Indian Tribe	Ahamakau Cultural Society
Colorado River Indian Tribes	Twenty-Nine Palms Band of Mission Tribes
Paiute Indian Tribe of Utah	Shivwits Band of Paiute Indian Tribe of Utah
Koosharem Band of Paiute Indian Tribe of Utah	Kanosh Band of Paiute Indian Tribe of Utah
Indian Peaks Band of Paiute Indian Tribe of Utah	Kaibab Paiute Tribe

2.4 SUMMARY OF SCOPING COMMENTS

Public Scoping Comments

The first public scoping meeting was held in Goodsprings, Nevada on March 5, 2002. Goodsprings is a rural community with a population of approximately 232 located 2.5 miles northwest from the proposed Goodsprings plant site location. Goodsprings residents are particularly interested in the proposed project because of their proximity to the Goodsprings plant site and the potential affect the generating facility could have on the community's quality of life. Their primary concerns focused on air quality, traffic safety on State Route (SR) 161, water supply, and public safety related to emergency fire and hazardous materials spill response. These concerns were amplified with the addition of other projects proposed in the area such as the Ivanpah Airport, the Kern River Pipeline expansion project, the Sempra Energy pipeline, and the Table Mountain Wind Farm as well as ongoing projects such as the construction of transmission lines serving the Reliant Bighorn Generating Facility in Primm, NV and the widening of I-15. Goodsprings residents requested that the proposed project be relocated and suggested a potential site that is west of I-15, between milepost (MP) 5 and MP 7. The Goodsprings Citizens Advisory Council submitted a summary of their comments in a letter to the Clark County Planning Committee. The letter is included in the public scoping document as part of the Administrative Record for this project.

The second public scoping meeting was held in Las Vegas, Nevada on March 6, 2002. Las Vegas is approximately 25 miles northeast from the proposed Goodsprings project site. Comments from participants generally focused around air quality and air quality permitting as well as the purpose and need for additional power generation in the area.

The final public scoping meeting was held in Sandy Valley, Nevada on March 7, 2002. Sandy Valley is a rural community with a population of approximately 1,800 located approximately 11 miles from the proposed Goodsprings project site. The primary concern expressed from Sandy Valley residents relate to water supply. Sandy Valley is located in a closed basin environment and the community's only source of water is groundwater. Residents wanted assurance that IEC would not use groundwater from Sandy Valley for plant construction and operation. Additional concerns included air quality, potential traffic impacts to SR 161, visual impacts associated with the project, and hazardous materials use, storage, and control.

A comprehensive list of public scoping comments received on the proposed IEC project is shown in Table 2-6. The comments are categorized by issue and the source of the comment is noted parenthetically after each comment.

Table 2-6 Public Scoping Comments By Subject and Source

Purpose and Need
▪ Need for additional power. (*Source: SC*)
▪ Where would power be sold. (*Source: G, LV*)
Water Supply
▪ Gray water from the Jean prison as adequate water source for plant operations. (*Source: SV*)
▪ Pumpage from existing water wells depleting water resources. (*Source: G*)
▪ Questions regarding the amount and source of water required for construction. (*Source: G, SV*)
▪ Concerns regarding water applications for Sandy Valley. (*Source: SV*)
Biological Resources
▪ Impacts to the Bighorn Sheep (*Source: LV*)
▪ Impacts to the Desert Tortoise and the proximity of the proposed project to the Desert Tortoise Translocation area. (*Source: LV*)
Land Use and Zoning
▪ Zoning change to M2 (Industrial) - industrial should be confined to one area. (*Source: G*)
▪ Notification of county hearing for zone change request. (*Source: SV*)
▪ New applications for BLM disposal areas. (*Source: G*)
▪ Landscape variance -- would disturbed land be revegetated. (*Source: G*)
Hazardous Waste
▪ Hazards of ammonia storage and ammonia use for refrigerant as well as monitoring for leaks. (*Source: G, SV*)
Waste Disposal
▪ Waste disposal and transport from the plant site. (*Source: SV*)
▪ Monitoring for accidental discharges. (*Source: G*)
Visual Resources
▪ Visibility of the plant from SH 161 - would plant color blend with landscape. (Source: SV)
▪ Impacts to existing view sheds from transmission lines. (*Source: G*)
Air Quality
▪ Deterioration of air quality and health issues associated with construction of the proposed project. (*Source: G*)
▪ Air permitting process (federal standards vs. state implementation plan). (*Source: LV*)
▪ Cumulative impacts to air quality (*e.g.* increased traffic resulting of the I-15 widening project, the Ivanpah Airport). (*Source: G, LV, SV*)
▪ Air quality impacts associated with construction dust. Request that the access road be paved or sealed. (*Source: G*)
▪ PSD (Prevention of Significant Deterioration) be included in the air quality analysis. (*Source: SC*)
▪ Visibility of emissions and would emissions create a "green cloud" similar to the chemical plant located in Henderson, NV. (*Source: G, SV*)
▪ Effects of air circulation generated from the wind farm. (*Source: G*)

Noise
▪ Noise generated from the plant. (*Source: G*)
▪ Effect of noise on wildlife (*e.g.* the Desert Tortoise, Bighorn Sheep). (*Source: G*)
▪ Noise variance the proponent requested from the county. (*Source: G*)
Socioeconomics (Employment, Economic Benefits)
▪ Local resident employment for construction and operation of the plant. (*Source: G, SV*)
▪ Consideration of a training program for local residents for employment in construction or operations of the plant. (*Source: SV*)
▪ Economic benefits for local communities. (*Source: G*)
Plant Site Alternatives
▪ Were other sites considered - request was made to move the proposed plant facility to west of I-15 between MP 5 and MP 7. (*Source: G, LV*)
▪ Was the APEX area considered? (*Source: G*)
▪ Move the plant to south of the intersection of the Valley Electric Association transmission line, the Reliant Bighorn to Arden transmission line, and the Kern River Gas Transmission pipeline. (*Source: L*)
Public Safety
▪ Length of emergency response time for Clark County Fire Department to respond to a fire or hazardous materials spill. (*Source: G*)
▪ Training for volunteer fire departments serving the plant site area. (*Source: G*)
▪ Safety measures at the plant site in the event of a fire or hazardous spill emergency. (*Source: G*)
Traffic Safety
▪ Traffic safety during construction of the plant and poor road conditions (*e.g.* poor line of site, steep grades and dips on SR 161). (*Source: G*)
▪ Impacts to traffic resulting from construction of several proposed projects in the area, particularly if construction schedules coincide, and the additional truck traffic from the haul road across SR 161 from the plant access road. (*Source: G*)
▪ Highway safety if construction takes place during the weekend when recreation traffic is heavy. (*Source: G*)
▪ SR 161 is the only paved access to Goodsprings and Sandy Valley. Concern that traffic studies would only account for "peak" traffic periods when many residents work shifts. (*Source: G, SV*)
Access Roads
▪ Consideration of alternative access roads. (*Source: G*)
▪ Road location and abandonment of the county road. (*Source: G*)
▪ Consider using the new Bighorn to Arden access road that intersects SR 161 for plant access to alleviate traffic safety concerns on SR 161. (*Source: L*)
▪ Consider accessing the plant from I-15 where the existing lines cross the interstate; this access could be used for both the proposed power plant and the proposed Table Mountain Wind Farm. (*Source: L*)
Transmission Lines
▪ Location and number of transmission lines required. Can lines to Table Mountain substation share the same structure? If the Table Mountain Wind Generation project is not approved, are the lines still needed? (*Source: G, SV*)
Gas Supply
▪ Are there alternate sources of natural gas and alternate fuels? (*Source: LV, SV*)

Plant Design
▪ Several questions regarding plant design including whether there would be silencers on the safety lifts, what safety measures would be implemented at the plant, would groundwater pollution equipment be installed, whether another compressor station be required; air equipment and monitoring systems, would stack scrubbers be installed, would the plant have a protective mat, would monitors be located at ground level, and the recovery system. *(Source: G, LV, SV)*
NEPA Process
▪ Final decision maker on the EIS. (*Source: LV*)
▪ Assurance that all environmental issues are analyzed in the EIS. (*Source: SC*)
Other
▪ Coordination of all proposed projects in the area to avoid damage to roadways and to consider public safety. (*Source: G*)
Sources: *Goodsprings - G; Las Vegas - LV; Sandy Valley - SV; Sierra Club - SC; Letter - L*

Agency Comments

Bureau of Land Management – Las Vegas Field Office

The proponent presented the proposed IEC project (Goodsprings Plant Site) to BLM staff resource specialists at a BLM scoping meeting held March 6, 2002. Comments expressed during the presentation generally were about water supply for plant operations and construction, plant site access, and biological resources. BLM staff resource specialists noted some of the following requirements for the project:

- A U.S. Fish and Wildlife Service (USFWS) Section 7 Consultation as directed under the Endangered Species Act;
- Visual impacts analysis using BLM VRM protocol as well as visual simulations to determine the level of visual impact; and
- A complete full Section 106 Consultation - cultural, paleontological, and Native American consultation.

Additionally, it was noted that the proposed project could potentially impact mining claims within the Ivanpah Valley as well as east of the valley. Other resource issues to be addressed were identified in writing and are included in Table 2-6.

U.S. Fish and Wildlife

A meeting with USFWS, along with a BLM representative, was held on April 1, 2002 to discuss details concerning the process of submitting and requirements for the Biological Assessment. The triangle survey method for the Desert Tortoise was recommended by USFWS, with concurrence from BLM, as required for Section 7 Consultation. A follow up meeting with USFWS to confirm "triangle" survey locations for the project was held on April 15, 2002.

Nevada Department of Wildlife

On April 5, 2002, a meeting was held with the Nevada Department of Wildlife (NDOW) concerning potential impacts to Desert Bighorn Sheep. Urbanization and grazing have created pressures on Bighorn sheep herds, and while the proposed

project alone would not have a direct impact, the concern was expressed that cumulatively, additional development would continue to affect Bighorn sheep habitat. Information regarding Bighorn Sheep migration and habitat within the project area was collected from NDOW resources. NDOW recommended further discussions with the Fraternity of Desert Bighorn, a volunteer organization that works to improve and preserve Bighorn Sheep Habitat.

Commission for the Preservation of Wild Horses

Written comments were submitted in a letter dated March 18, 2002 from the State of Nevada, Department of Conservation and Natural Resources, Commission for the Preservation of Wild Horses. The letter summarized concerns regarding wild horse and burro management within the Red Rock Herd Management Area (HMA) and the potential for impacts resulting from the Table Mountain Wind Energy Project, Kern River 2003 Expansion Project, and the Ivanpah Energy Center Project. Since the IEC project is located several miles south of the HMA, the Commission had no concerns regarding impacts to horse and burro management.

Nevada Natural Heritage Program

The Nevada Natural Heritage Program responded with comments regarding the proposed Ivanpah Energy Center Project in a letter dated April 10, 2002. As an attachment to the letter, a list of species recorded within a 3-mile buffer zone of the proposed project area was included as well as potential habitat for the following sensitive species: Chuckwalla (*Sauromalus obesus*), a BLM Sensitive Species; Brazilian free-tailed bat (*Tadarida brasiliensis*), a Nevada Natural Heritage Program Sensitive Species; and the Las Vegas bearpoppy (*Arctomecon californica*), a BLM Special Status Species/Listed as critically endangered under Nevada State law. Data for various raptors occurring in the project area would have to be obtained from the Nevada Department of Wildlife and while not tracked by the Nevada Natural Heritage Program, all cacti, yucca, and Christmas trees are protected by Nevada State law (NRS527.060.120).

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers, Sacramento District, St. George Regulatory Office confirmed in a letter dated July 1, 2002 that the proposed Ivanpah Energy Center project would not need a Department of the Army permit in accordance with Section 404 of the Clean Water Act. Based on information provided, the Corps concurred that the ephemeral washes potentially affected by the project are non-navigable, intrastate, and isolated; and therefore, would not be considered Jurisdictional Waters of the United States.

U.S. Fish and Wildlife Service/ Nevada Fish and Wildlife Office

The U.S. Fish and Wildlife Service and the Nevada Fish and Wildlife Office responded in a letter dated June 27, 2002 regarding threatened and endangered species and species of concern that may occur in the proposed project area. An enclosure provided a list of species as required of the U.S. Fish and Wildlife Services pursuant to Section 7(c) of the Endangered Species Act of 1973, as amended (Act) as well as a list of species of concern to the Nevada Fish and Wildlife

that may occur in the project area. A second enclosure included a map of designated critical habitat for the desert tortoise in the vicinity of the project. Other issues addressed in the letter concerned initiation of Consultation under Section 7(c) of the Act, compliance with the Migratory Bird Treat Act, and Section 404 of the Clean Water Act.

Western Area Power Administration

The Western Area Power Administration (Western) contacted the BLM during August 2002 and requested inclusion in the EIS as a Cooperating Agency.

As of this writing, no other comments regarding the Ivanpah Energy Center Project, written or verbal, have been received from government agencies or Tribes. A comprehensive list of agency scoping comments received on the Ivanpah Energy Center project is shown in Table 2-7. The comments are categorized by issue and the source of the comment is noted parenthetically after each comment.

Table 2-7 Agency Scoping Comments

Minerals/Mining Claims
▪ The proposed project will traverse mining claims through Ivanpah Valley and east of the valley. (*Source: BLM*)
Water Supply
▪ Adequate gray water supply from SNCC for plant operations. *(Source: BLM)*
▪ Adequacy of the prison's wastewater treatment facility. *(Source: BLM)*
▪ New water wells closer to plant site. *(Source: BLM)*
Biological Resources
▪ Consultation with USFWS is required under the Endangered Species Act because the project is an EIS. (*Source: BLM*)
▪ Triangle survey method for Desert Tortoise is recommended for the USFWS Section 7 Consultation. *(Source: USFWS*)
▪ Confirm that the plant site boundary is located outside the Desert Tortoise Translocation Area. (*Source: BLM*)
▪ Develop alternatives including access roads to avoid sensitive species (*e.g.* white-margined penstemon). (*Source: BLM*)
▪ GIS coverage of the proposed project in ArcInfo or ArcView Shape file is required for overlay of special status plant species. *(Source: BLM)*
▪ Obtain current special status plant species from the Nevada Natural Heritage Program. (*Source: BLM*)
▪ Conduct plant surveys in mid-April to identify white-margined penstemon and both varieties of two-toned penstemon. (*Source: BLM*)
▪ Cacti and yucca will be salvaged per the Restoration Plan. (*Source: BLM*)
▪ Disturbed areas will be restored according to the BLM approved restoration plan. (*Source: BLM*)
▪ Additional development could potentially affect Bighorn Sheep habitat. (*Source: NDOW*)
▪ No concerns regarding potential impacts to the Red Rock Horse and Burro Management Area. (*Source: Commission for the Preservation of Wild Horses*)
Cultural Resources
▪ Project will require a complete full Section 106 consultation, cultural, paleontological, and Native American consultation. (*Source: BLM*)
Rangeland Management
▪ Rangeland Management is a separate resource that includes grazing and should be analyzed separately. (*Source: BLM*)
▪ Proposed project passes through Pastures #2 and #3 of the Jean Lake grazing allotment (#15416). (*Source: BLM*)
▪ Potential impacts could occur depending on where the livestock are located in the rotation and schedule of construction. (*Source: BLM*)
Recreation
▪ The recreation area is limited to "existing roads, trails, and dry washes" except for a portion of Jean Dry Lake. (*Source: BLM*)

Hazardous Waste
▪ State how hazardous materials (as defined under CERCLA) will be used, produced, transported or stored on the project site. (*Source: BLM*)
▪ State measures that will be used to minimize the possibility of a release. (*Source: BLM*)
▪ In the event of a release, follow the National Contingency Plan and notify BLM. (*Source: BLM*)
▪ Strict liabilities will be required. (*Source: BLM*)
Visual
▪ Visual simulations are required based on KOPs of entire project. (*Source: BLM*)
▪ Visual analysis must follow BLM VRM. (*Source: BLM*)
Access Roads
▪ Justification of new access roads is required. (*Source: BLM*)
▪ Define long-term access roads for all facilities including gas supply line, water supply line, transmission line, *etc.* (*Source: BLM*)
▪ Existing roads or access of permanent right of way for maintenance will require restoration, and an absolute requirement in sensitive plant habitat. (*Source: BLM*)
Site Access
▪ Conflicts with proposed KRGT expansion project restoration plan. (*Source: BLM*)
▪ Use of existing KRGT project access road from the south. (*Source: BLM*)
Transmission Lines
▪ Question about stringing multiple power lines on one or more existing structures. (*Source: BLM*)
Project Description
▪ Confirm acreage disturbance calculations, define temporary and permanent disturbance. (*Source: BLM*)
Facility Construction
▪ Identify fueling and landing areas for helicopters used to string transmission lines. (*Source: BLM*)
▪ Clarification of whether the water supply line will have permanent or temporary disturbance. (*Source: BLM*)
Plan of Development (POD)
▪ Combine all facilities associated with project into one POD. (*Source: BLM*)

Summary of Special Interest Group Comments

Goodsprings Town Board Special Meeting – February 12, 2002

The proponent met with the Goodsprings Town Board on February 12, 2002 to provide information regarding the proposed IEC project (Goodsprings Plant Site). Participants included four members of the Board, IEC representatives, and Clark County's local Town Board liaison. In summary, the Board expressed concerns about the proposed project (Goodsprings Plant Site) that included air quality, traffic impacts to SR 161 during construction and plant operation, plant safety measures, water supply, visual impacts, local job opportunities, and public safety relating to emergency fire response. The comments and concerns expressed by the Goodsprings Town Board have been incorporated in Table 2-5. As a result of the meeting, the Goodsprings Town Board prepared a letter summarizing their primary concerns for submittal to Clark County.

Goodsprings Town Board Meeting – March 28, 2002

Lucinda M. Parker of Clark County Department of Air Quality Management (DAQM) made a presentation to the Goodsprings Town Board explaining the county's authority in air quality management and how that relates to projects that are proposed in the area. The project proponent was available to answer questions. Functions of the DAQM include monitoring air quality in the county and issuing citations for exceedances of allowable emissions. The IEC project would be closely monitored for PM_{10} levels during construction. Ms. Parker encouraged Goodsprings residents to contact the county's Air Quality Control with any air quality concerns. The county's Town Board liaison for Goodsprings reported that in discussions with Lewis Wallenhymer, Clark County Multi-Species Habitat Conservation Plan (MSHCP) Implementation and Monitoring, that relocating the proposed Goodsprings project to a site that is west of I-15 at MP 5 and MP 7 would place the plant site in the Desert Tortoise Translocation area.

Clark County Fire Department

A meeting was held with the Clark County Fire Department on April 11, 2002 to identify fire department requirements and recommendations regarding the IEC project. The proponent provided a description of the project and proposed fire protection equipment and plans for ensuring fire safety and emergency medical response. To address the primary concerns expressed by the Clark County Fire Department, IEC agreed to use aqueous, rather than anhydrous, ammonia for emissions control at a concentration of less than 20 percent; paving of the main access road to 20-ft width, and use of potable water for fire fighting.

City of Boulder City

A presentation was held on April 30, 2002 to describe the IEC project to City of Boulder City staff and provide City staff the opportunity to express concerns regarding the proposed project. Portions of the transmission line route crossing Eldorado Valley to the Mead Substation are located on private land owned by Boulder City. Two other proposed projects affecting Boulder City, the realignment of U.S. 93 and the U.S. 95 widening (Laughlin Highway to Railroad

Pass) were discussed; however, the City expressed no concerns regarding conflicts with the IEC project. Information regarding special recreational events, permitted by the City, was obtained from the City of Boulder City's Parks and Recreation Department to determine if potential impacts to recreation activities would occur during construction of the transmission line.

Quality Earth Materials

A meeting was held on May 17, 2002 with Quality Earth Materials, a mining company, to discuss potential conflicts associated with the construction and operation of the proposed IEC transmission line and mining operations. The proposed transmission line would be located on the southern portion of the company's claim; however, mining operations are planned for the northern portion of the claim, and then work towards the southern portion. Since mining would not take place in the vicinity of the transmission line for almost 30 years, potential conflicts are not expected. Additionally, Quality Earth Materials offered acreage that could be fenced as a temporary laydown area for transmission line construction.

Fraternity of Desert Bighorn

On May 28, 2002, a meeting was held with members of the Fraternity of Desert Bighorn Sheep, a volunteer organization that works to preserve and improve Desert Bighorn Sheep habitat. Discussions focused around an area where the proposed transmission line crosses the McCullough Range. The group's concerns were primarily related to construction activities of the transmission line. Big Game hunting occurs during the months of November and December; lambing season occurs during February, March, and April. Construction during these months should be avoided. Additionally, to avoid helicopter flyovers over crucial habitat, helicopter pads should be located at either the east or west end of the mountain pass.

Clark County Multi-Species Habitat Conservation Plan and Monitoring Committee

A presentation was made to the monthly Multi-Species Habitat Conservation Plan and Monitoring Committee meeting on June 26, 2002. The presentation included a description of the proposed project and discussion regarding existing plant and wildlife species' habitat within the project area, the potential impacts to habitat resulting from construction and operation of the proposed project, and mitigation measures to reduce any potential impacts. Approximately 32 people were in attendance from various groups including BLM, Red Rock Audubon, the Tortoise Group, National Parks Service, Nevada Department of Wildlife, Partners in Conservation, as well as representatives from off-road enthusiasts, mining interests, and the University of Nevada-Reno. Concerns from the group primarily were related to potential impacts to *penstemon* communities, particularly *penstemon albomarginatus* located on the east side of I-15 and potential impacts to drainage associated with construction of the power plant (Goodsprings Plant Site).

SECTION 3
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Diamond Generating Corporation recognized the need for increased power generation in southern Nevada and proceeded to explore options that could be implemented to meet the needs. In doing so, the firm evaluated alternative technologies and plant sizes, potential plant locations and sites, and various project components.

3.1 ALTERNATIVE PROJECT SIZES AND TECHNOLOGIES CONSIDERED

Alternative project sizes were evaluated to identify one that would best meet the project purpose and need. Although larger plants, capable of 750 to 1,000 megawatt (MW) generation, can be constructed, economies of scale in power generation are largely realized at the 500 MW size. As a merchant plant that would sell into a highly volatile and competitive electric market, an investment in a plant that would be larger than that proposed cannot be justified. Therefore, consideration of a 750 to 1,000 MW (or larger) plant was not carried forward. Construction of a smaller generating facility is technically feasible; however, they typically suffer from "inverse economies of scale" and are substantially less feasible from a business perspective.

The application of simple-cycle gas turbine technology (rather than combined-cycle technology) was considered. A simple-cycle system would use one or more gas turbine generator sets and would not include the steam turbine-generator component. A simple-cycle generator is capable of rapid start and load-following, and can operate as a "peaking" power plant. Such plants typically operate during periods of high electricity demand. However the efficiency of a simple-cycle plant, as measured by the amount of natural gas fuel required to produce a given amount of electrical power, is substantially less than that of a combined-cycle facility. The lower efficiency of simple-cycle facilities results in greater generation costs and greater natural gas consumption (per kilowatt hour of energy produced) than that of a combined-cycle.

Diamond Generating Corporation also considered construction and operation of a coal-fired power plant. Although development of a coal-fired power plant has been suggested for the Ivanpah Valley and other Clark County areas, capital costs and environmental constraints make it a less than viable option. A coal-fired facility would require construction of rail facilities, coal handling equipment, and air emissions controls that would be more complex and expensive than that of a gas-fired plant. Other factors that would require consideration include ash disposal and control of runoff from stockpiled coal.

The Ivanpah Energy Center would use an air-cooled condenser, in a process referred to as dry cooling, to condense spent steam from the steam turbine so that it can be re-used. Dry cooling reduces plant water usage, by 90 percent or more as compared to wet cooling with a conventional cooling tower. For a 500 MW combined-cycle plant of the type proposed, dry cooling reduces water usage from 3,000 acre-feet per year (afy) or more to about 300 afy. The technology is proposed for most, if not all, gas turbines recently proposed or permitted in Clark County. In order to

further reduce water requirements at the proposed plant, inlet air to the gas turbines would be cooled using mechanical refrigeration rather than evaporative cooling to increase inlet air density and thus increase turbine power output. The combination of dry cooling and refrigerated air will reduce water requirements at the Ivanpah Energy Center to 50 afy or less.

A refrigerated air-cooled combined-cycle gas-fired system was selected for development because it represented an optimum balance between efficiency, cost, and environmental considerations. A nominally-rated 500 MW facility was selected as the optimum plant size.

3.2 ALTERNATIVE PLANT LOCATIONS CONSIDERED

Development and operation of a gas-fired power plant is dependent upon availability of:

- land,
- plant site access,
- a reliable natural gas supply,
- a reliable water source, and
- a suitable interconnection to the area utility grid.

Diamond Generating Corporation identified several alternative power plant locations within southern Nevada that potentially could be used for project development. Locations considered included the APEX area, Sandy Valley, Eldorado Valley, and Ivanpah Valley, as shown on Figure 3-1.

Was APEX area considered?

Apex Area

Potential plant locations in the Apex area of Clark County (north of Las Vegas) were identified, but eliminated from further evaluation. Although the Apex area is relatively remote and generally absent of sensitive receptors (*e.g.* residential areas), numerous power plants are either under construction or being planned for the area. The recent proliferation of new or proposed power plants in the area, and the need for improved electrical transmission capabilities in the area precluded it as a viable candidate for development. The Apex area is constrained by a lack of transmission capability, which has resulted in a series of planning studies to identify potential 500 kV corridors to Mead, Marketplace, and other substations in the Las Vegas area. Other factors that precluded further consideration of the area for additional power generation includes the lack of a suitable "gray water" source and the consequential total dependence on water that would be provided by the Las Vegas Valley Water District (LVVWD) or from groundwater sources.

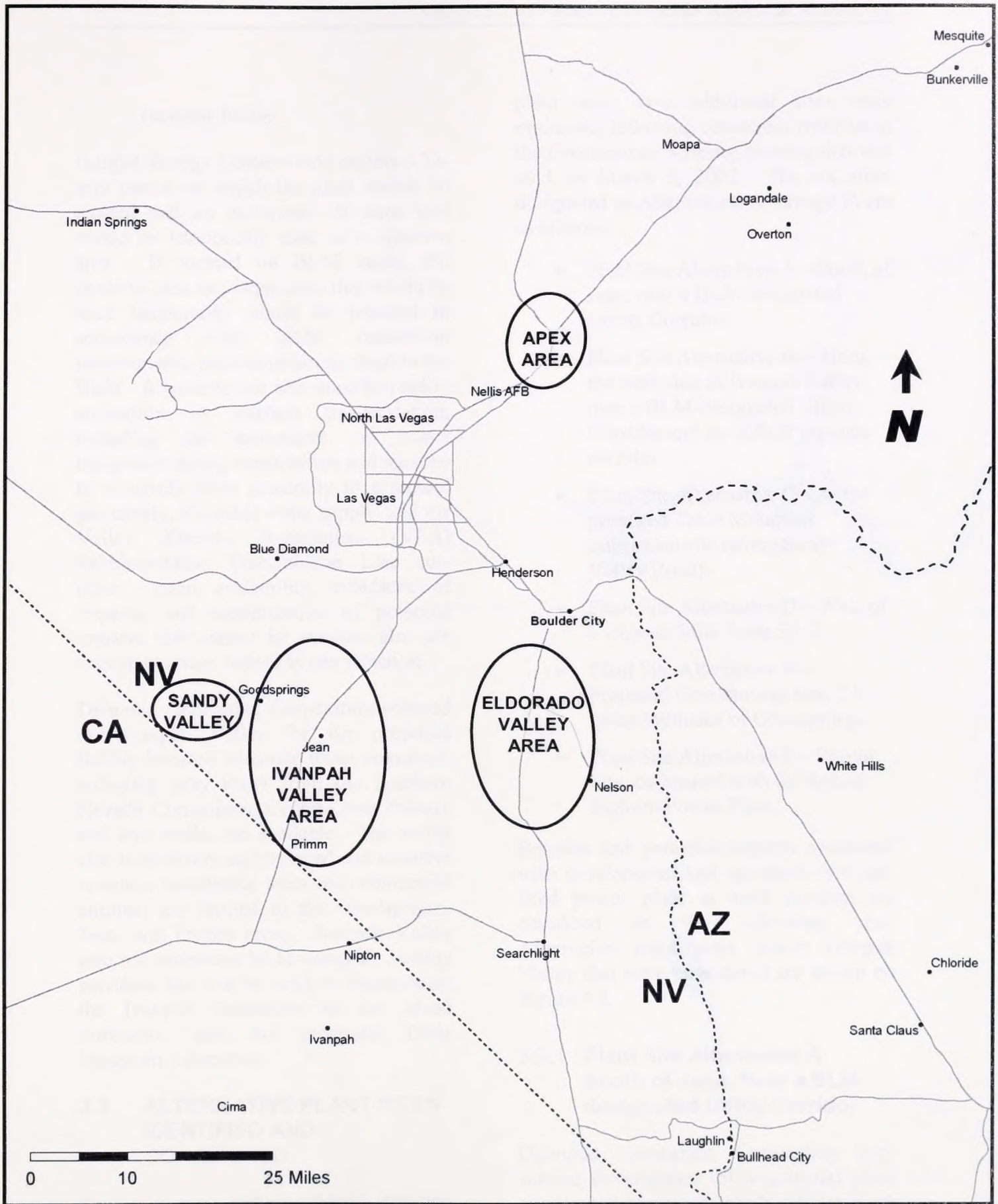
Sandy Valley Area

Sandy Valley was identified as a potential plant location, but not carried forward for further consideration. Although suitable land resources are available, a gray water source was not available and the use of groundwater resources in the valley was considered by Diamond Generation Corporation to be inappropriate for power plant purposes. Sandy Valley lies within a closed basin with limited groundwater availability. The use of groundwater from Sandy Valley could reduce the availability of the resource to area residents and agricultural entities, which could result in potentially irreversible adverse impacts to

the local economy, and the lifestyle of the residents. Furthermore, construction and operation of a facility in Sandy Valley would require access along Sandy Valley Road; adverse impacts to traffic and traffic safety would likely result from the movement of heavy equipment and plant workers.

Eldorado Valley

Potential plant sites in Eldorado Valley also were considered, but not carried forward for further consideration. Although several substation options and transmission line corridors are available in the Eldorado Valley that could provide opportunities to interconnect to the southern Nevada utility grid, natural gas supply options in the area are limited to the extent that a pipeline would need to be constructed from the Kern River Gas Transmission (KRGT) pipeline in the Goodsprings area. The area also lacks opportunities to utilize gray water from industrial or municipal sources and a large portion of the land has been designated by the City of Boulder City as open space, conservation, and recreational areas.



PARSONS | ***IVANPAH ENERGY CENTER PROJECT*** | ***FIGURE 3-1 PLANT SITE LOCATIONS EVALUATED***

Ivanpah Valley

Ivanpah Energy Center would require a 30-acre parcel on which the plant would be located and an additional 10 acres that would be temporarily used as a laydown area. If located on BLM lands, the laydown area and other areas that would be used temporarily would be restored in accordance with BLM restoration requirements, prior to returning them to the BLM. A suitable site also must be readily accessible by surface transportation, including the movement of heavy equipment during construction and must be in relatively close proximity to a natural gas supply, a reliable water supply, and the Valley Electric Association (VEA) Pahrump-Mead Transmission Line corridor. Land availability, avoidance of impacts, and minimization of potential impacts that cannot be avoided also are important issues related to site selection.

Diamond Generating Corporation selected the Ivanpah Valley for the proposed facility because adequate water resources, including gray water from the Southern Nevada Correctional Center (Jean Prison), and area wells, are available. The valley also is relatively undeveloped and sensitive receptors (residential areas and commercial entities) are limited to the Goodsprings, Jean, and Primm areas. Ivanpah Valley also has numerous BLM-designated utility corridors that can be used to interconnect the Ivanpah Substation to the Mead Substation and the proposed Table Mountain Substation.

3.3 ALTERNATIVE PLANT SITES IDENTIFIED AND CONSIDERED

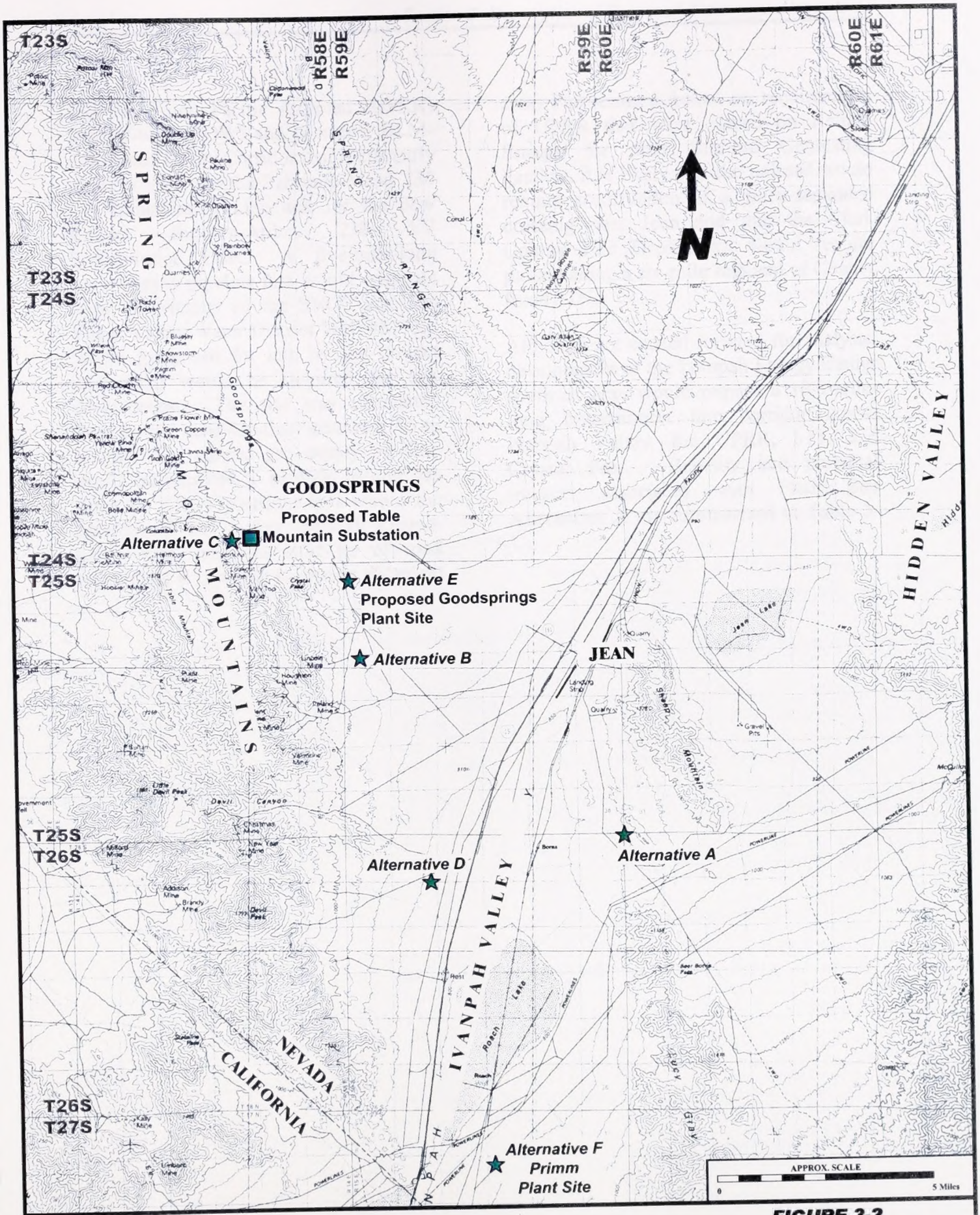
Four sites were initially identified within the Ivanpah Valley as potentially suitable plant sites; two additional sites were evaluated, following comments received at the Goodsprings Scoping Meeting that was held on March 5, 2002. The six sites, designated as Alternatives A through F, are as follows:

- Plant Site Alternative A—South of Jean, near a BLM-designated Utility Corridor.
- Plant Site Alternative B—Along the west side of Ivanpah Valley, near a BLM-designated Utility Corridor and the KRGT pipeline corridor.
- Plant Site Alternative C—At the proposed Table Mountain Substation site (along Sandy Valley Road).
- Plant Site Alternative D—West of I-15, near Mile Posts 5 – 7.
- Plant Site Alternative E—Proposed Goodsprings Site, 2.5 miles southeast of Goodsprings.
- Plant Site Alternative F – Primm Site, co-located with the Reliant Bighorn Power Plant.

Benefits and potential impacts associated with development and operation of a gas-fired power plant at each location are described in the following text. Alternative plant sites within Ivanpah Valley that were considered are shown on Figure 3-2.

3.3.1 Plant Site Alternative A South of Jean, Near a BLM-designated Utility Corridor

Diamond Generating Corporation considered development of a potential plant site located approximately five miles south of Jean Nevada. The site is east of I-15



PARSONS

IVANPAH ENERGY CENTER PROJECT

FIGURE 3-2
PLANT SITE ALTERNATIVES WITHIN IVANPAH VALLEY

and the Union Pacific Railroad (UPRR) right-of-way (ROW) and is near a BLM-designated Utility Corridor that is currently used by VEA for the Pahrump-Mead 230 kV Transmission Line and for the new Reliant Bighorn-Arden 230 kV Transmission Line. A five-mile-long water supply pipeline that would originate from the vicinity of the SNCC and Las Vegas Valley Water District Well #52732/ 52735 (proposed for use by the project proponent) would be required for site development. The site was eliminated from further consideration because a 7.5 to 12-mile-long natural gas supply pipeline would be required to provide natural gas from the KRGT pipeline; it is within the Jean/Roach Dry Lakes Special Recreational Area, which is used for off-road racing; and it is within a grazing allotment area. Furthermore, based on requirements of UPRR that were placed on Reliant Energy for their Bighorn Generating Facility, it is likely that the railroad would require construction of a grade-separated crossing near Jean and that the Clark County Fire Department would require paving along a six-mile segment of County Road 31N.

Although not carried forward for analysis, development of the Ivanpah Energy Center south of Jean would require a 10.0-mile-long transmission line corridor across Ivanpah Valley, the UPRR, I-15, and Crystal Pass. Benefits and potential impacts associated with Plant Site Alternative A are summarized in Table 3-1.

Table 3-1 Plant Site Alternative A

Plant Site Alternative A South of Jean, near a BLM-designated Utility Corridor	
Natural Gas Interconnect from KRGT	7.5 to 12.0 miles long (depending upon route selected), crossing under I-15 and the UPRR ROW
Electrical Interconnect to Table Mountain Substation	10.0-mile corridor length (entirely within a BLM-designated utility corridor).
IEC Substation to Mead Substation Transmission Line	33.0 to 35.0 miles long (entirely within a BLM-designated utility corridor), would not cross I-15 or UPRR ROW
Water supply pipeline	5.0 miles long, primarily parallel UPRR ROW and within a BLM-designated utility corridor.
Plant site access	Access from existing unimproved County Road 31N (RS 2477-designated). Grade separated railroad crossing and paving may be required.
Visual impacts	Electrical Interconnection to Table Mountain Substation (double-circuit) would result in visual impacts at the I-15 crossing. The plant site would be approximately 4 miles from I-15 and Jean and would not be screened from most views.
Construction access	Minimal access problems associated with movement of heavy loads.
Transportation safety issues	Minimal surface transportation safety issues anticipated.
Other factors	The plant site is within a BLM-designated special use recreation area and grazing area.

3.3.2 Plant Site Alternative B Intersection of the BLM-designated Utility Corridor and KRGT Pipeline Corridor

A potential plant site located near the intersection of the BLM-designated utility corridor that is occupied by the VEA Pahrump-Mead 230 kV Transmission Line and the new Reliant Bighorn-Arden 230 kV double-circuit transmission line and the KRGT pipeline corridor was considered. The site is approximately 2.0 miles south of the proposed Goodsprings Plant Site and within the Desert Tortoise Translocation Area. Development of the site would require minimum interconnection distances between the VEA Transmission Line (although a new transmission line from the plant site to the Western Area Power Administration [Western] Mead Substation would continue to be needed) and the natural gas supply pipeline from KRGT. The alternative also would require construction of improved access along a relatively long access road (County Road 28) and a relatively long (5.5 miles) interconnection to the Table Mountain Substation. The site was ultimately eliminated from further consideration because it is within the Desert Tortoise Translocation Area and because existing access roads would require extensive improvements within the Translocation Area. Benefits and potential impacts associated with Plant Site Alternative B are summarized in Table 3-2.

Move the plant to south of the intersection of the VEA transmission line, the Reliant Bighorn transmission line, and the Kern River Gas Transmission pipeline.

Table 3-2 Plant Site Alternative B

Plant Site Alternative B Near a BLM-designated Utility Corridor and KRGT Pipeline Corridor	
Natural gas interconnect from KRGT	Minimal interconnection distance needed
Electrical Interconnect to Table Mountain Substation	5.5-mile corridor length (entirely within BLM utility corridor).
IEC Substation to Mead Substation Transmission Line	38.0 to 40.0 mile long (entirely within BLM utility corridor and crossing I-15 and UPRR ROW).
Water supply pipeline	6.5 miles long, primarily parallel the UPRR ROW and within BLM-designated utility corridor.
Plant site access	Access from existing RS 2477 designated county roads
Visual impacts	Electrical interconnection to Table Mountain Substation would result in relatively low visual impacts; however, potential visual impacts related to the plant site from Jean and I-15 would be relatively high. The plant site would be approximately 5 miles from I-15 and Jean and would not be screened from most views.
Construction access	Minimal access problems associated with movement of heavy loads.
Transportation safety issues	Minimal transportation safety issues anticipated, if heavy equipment were to avoid SR 161
Other factors	The site is within the Desert Tortoise Translocation Area.

3.3.3 Plant Site Alternative C Site Near the Proposed Table Mountain Substation

A site located along the Pahrump-Mead Transmission Line Corridor and near the Table Mountain Substation was identified as a potential plant location. The site would have good access to the existing VEA 230 kV Transmission Line and the Table Mountain Substation; the KRGT pipeline interconnection would be approximately 3.7 miles from the plant site. An 11.5-mile-long water supply pipeline would be required.

The potential plant site was eliminated from further consideration because it is at an elevation that would reduce the efficiency of the turbine generators and because construction and operations would result in high levels of visual impacts to the Goodsprings community and travelers along Sandy Valley Road. Furthermore, plant site access would be limited to SR 161 and Sandy Valley Road, which could result in traffic safety issues. Potential impacts to residents of Goodsprings and Sandy Valley would be greater than any of the other alternative sites considered. Benefits and potential impacts associated with the Plant Site Alternative C are summarized in Table 3-3.

Table 3-3 Plant Site Alternative C

Plant Site Alternative C Near the Proposed Table Mountain Substation	
Natural gas interconnect from KRGT	3.7-mile-long gas pipeline required.
Electrical Interconnect to Table Mountain Substation	Interconnection corridor required and related transmission lines would be short and entirely within BLM utility corridor.
IEC Substation to Mead Substation Transmission Line	43.0 to 45.0 miles long (entirely within BLM utility corridor).
Water supply pipeline	Primarily parallel to existing UPRR ROW and within BLM-designated utility corridor. The pipeline length would total approximately 11.5 miles.
Plant access	Access from existing Sandy Valley Road which could result in traffic safety issues along SR 161 and Sandy Valley Road, primarily during construction.
Visual impacts	Impacts from the plant along Sandy Valley Road and residents of Goodsprings would be very high. Visual impacts associated with the Ivanpah-Mead Transmission Line would be similar to Alternatives B and E.
Construction access	No reasonable alternative routes are available for construction traffic.
Transportation safety issues	Access along SR 161 and Sandy Valley Road could result in traffic safety issues.
Other factors	Plant efficiency would be compromised due to site elevation.

3.3.4 Plant Site Alternative D Site West of I-15 Between Mile Post 5 and 7

Comments received during the Goodsprings Public Scoping Meeting (refer to Section 2) indicate that some individuals in the community would like the plant site to be relocated from the proposed Goodsprings location to an alternative site. Some residents suggested that a potential site between I-15 Mile Post 5 and 7 be considered.

Development of a site between Mile Post 5 and 7 would require construction of a double-circuit transmission line from the IEC Substation to the proposed Table Mountain Substation, a distance of 8.5 miles. A 4.5-mile segment of transmission line also would be required to intertie to the existing Pahrump to Mead Transmission Line corridor which is within a BLM-designated Utility Corridor. Both circuits would parallel I-15 for a distance of approximately 4.5 miles. Construction of the circuits (presumably on single-pole double-circuit structures) would result in visual impacts within an area that is presently absent of transmission lines.

Were other sites considered? A request was made to move the proposed facility to west of I-15 between MP 5 and MP 7.

Development of the site also would require construction of a water supply line from Jean, across the eastern portion of the Ivanpah Valley and parallel to I-15 to the plant. Approximately 4.5 miles of the route would not be within a BLM-designated Utility Corridor. Construction and operation of a facility along the west side of I-15 would introduce visual impacts to an area that is largely absent of such features. Natural gas could be provided from the KRGT pipeline, approximately one mile to the west.

Access to a suitable plant site between Mile Post 5 through 7 would require the acquisition of right of way through Whiskey Pete's Casino property, located west of I-15 at Primm, Nevada or use of County Road 28 and improvements to an existing unimproved county road to the plant site. Approximately 5 to 6 miles of road improvements would be required to provide access from Primm; approximately one mile of County Road 28 and an additional three miles of new road construction through undisturbed desert would be required to provide access from SR 161. The plant site and nearly all access roads would be within the Desert Tortoise Translocation Area.

The site was eliminated from further consideration because it is within the Desert Tortoise Translocation Area, several miles of transmission lines would parallel I-15 and because several miles of transmission line and pipeline would not be within BLM-designated Utility Corridors. Installation of transmission lines along I-15 also could interfere with development of the proposed Ivanpah Airport. Benefits and potential impacts associated with Plant Site Alternative D are summarized in Table 3-4.

Table 3-4 Plant Site Alternative D

Plant Site Alternative D West of I-15 Between Mile Post 5 and 7	
Natural Gas Interconnect from KRGT	One-mile-long gas pipeline required.
Electrical Interconnect to Table Mountain Substation	An 8.5-mile-long transmission line corridor would be required. The line could be constructed on single-pole double-circuit structures. 4.5 miles of corridor would not be within a BLM-designated Utility Corridor.
IEC Substation to Mead Substation Transmission Line	Approximately 40 miles long; including 4.5 miles of which that would not be within a BLM-designated Utility Corridor. The total corridor length (including the Table Mountain Substation interconnection would be approximately 49 miles long).
Water supply pipeline	The pipeline length would total approximately 8.0 miles, including 4.5 miles that would not be within a BLM-designated Utility Corridor.
Plant access	Major improvements required and/or new road construction from either Primm or Jean.
Visual impacts	The plant and transmission line would introduce visual impacts to an area that is relatively free of such features. The level of visual impacts associated with the transmission line and interconnection lines to the proposed Table Mountain Substation would be greater than that of sites that are adjacent to designated BLM utility corridors.
Construction access	No reasonable alternative routes are available for construction traffic.
Transportation safety issues	Minimal adverse impacts to transportation safety.
Other factors	Development of the site and installation of the transmission line parallel to I-15 could conflict with development plans for the Ivanpah Airport. The site, new access roads, and natural gas supply pipeline are within the Desert Tortoise Translocation Area.

3.3.5 Plant Site Alternative E Proposed Goodsprings Site

The Goodsprings Plant site is proposed by the project proponent. The plant site (Alternative E) (Application Serial No. N-75493) was identified as a potential plant location because it is adjacent to the KRGT pipeline (Application Serial No.: N-75471), near the proposed Table Mountain Substation, and near a BLM-designated Utility Corridor which would facilitate interconnection to the VEA Pahrump-Mead Transmission Line. The site also would be screened from most views by topographic features to the north and west to the extent that only occasional views of the plant potentially could be seen from SR 161 and Sandy Valley Road (a portion of the plant also would be seen from one residence). The site is approximately 2.3 miles from the nearest residence. Water would be provided from the Southern Nevada Correctional Center in Jean; a well that is located near the correctional center (proposed for use by the project proponent) would be used to supplement correctional facility gray water. The water supply pipeline (Application Serial No.: N-75475) would parallel the UPRR and would be within the proposed Ivanpah-Mead Transmission Line corridor. The proposed plant site was carried forward for further analysis.

Process water for the Ivanpah Energy Center would be provided through a 10.9-mile-long pipeline from a water treatment facility that would be located on State of Nevada land that is near the SNCC or on State of Nevada land that is within the confines of SNCC-operated rapid infiltration basins. Well # 52732/52735 (proposed for use by the project proponent), located near the SNCC, would be available as a supplemental water source, should gray water flows from the SNCC become insufficient to meet plant needs.

Benefits and potential impacts associated with Plant Site Alternative E are summarized in Table 3-5.

Table 3-5 Plant Site Alternative E

Plant Site Alternative E Proposed Goodsprings Site	
Natural gas interconnect from KRGT	A short natural gas pipeline would be required.
Electrical Interconnect to Table Mountain Substation	Interconnect corridor required and essentially all transmission lines would be relatively short (approximately 3.0 miles) and almost entirely within BLM-designated Utility Corridor.
IEC Substation to Mead Substation Transmission Line	Approximately 43 miles long (entirely within BLM-designated Utility Corridor).
Water supply pipeline	Primarily parallel to the UPRR ROW and within BLM-designated utility corridor. The pipeline length would total approximately 10.9 miles.
Plant access	Access from existing SR 161 which could result in traffic safety issues. An alternative access road could be developed to alleviate construction equipment impacts along SR 161.

Plant Site Alternative E Proposed Goodsprings Site	
Visual impacts	Impacts from SR 161, Sandy Valley Road, and I-15 would be low due to intervening topography (hills and mountains) and distance.
Construction access	An alternative construction route could be established along existing county roads (County Road 53Y, an existing trail, and County Road 28) to reduce the need to move heavy equipment along SR 161.
Transportation safety issues	Access along SR 161 could result in traffic safety issues.
Other factors	The plant site is north of the Desert Tortoise Translocation Area. A portion of the interconnection transmission lines to the proposed Table Mountain Substation would be visible from Sandy Valley Road.

3.3.6 Plant Site Alternative F – Primm Plant Site

The Primm Plant Site was identified as a potential location for the Ivanpah Energy Center and was carried forward for further consideration. Construction at the Primm Plant site was suggested by the project proponent as a viable alternative location for the Ivanpah Energy Center. If constructed at the Primm site, the facility would be co-located with the Reliant Bighorn Power Plant on a 166-acre parcel that is currently under lease by Reliant Energy. Reliant Energy received authorization to construct their 500 MW combined-cycle gas-fired power plant, a 38-mile-long double-circuit transmission line, a 3.2-mile-long natural gas supply pipeline, and related facilities components from Clark County and the BLM during the fall of 2001.

Zoning change to M2 (Heavy Industrial) - Industrial should be confined to one area.

Approximately 85 acres of the 166-acre parcel were rezoned for heavy industrial use (M-2), at the request of Reliant Energy. When operational, the Bighorn facility will occupy approximately 40 acres of the western portion of the 166-acre parcel; approximately 45 acres of M-2-zoned industrial land would be available for development. However, additional lands within the 166-acre parcel are likely to require rezoning, if the Primm Plant Site were to be developed. The Bighorn facility is currently under construction and is expected to be operational during the fall of 2003.

If constructed on the portion of land that is leased by Reliant Energy and has been rezoned as M-2, the Ivanpah Energy Center would occupy a portion of the remaining 45 acres that have been rezoned. The original 166-acre parcel is approximately one mile east of Primm, Nevada and east of the UPRR.

Construction of the Ivanpah Energy Center at the Primm Site (Plant Site Alternative F) would require construction of a natural gas pipeline that would parallel a similar natural gas pipeline that will be installed by Kern River Transmission Company for the Reliant Bighorn facility. The 3.2-mile-long natural gas pipeline would connect to the KRGT, west of I-15, crossing under the interstate and UPRR to the Primm Plant Site. A 100 by 200-foot (0.46 acre) metering station also would be required at the KRGT pipeline. The metering station would be located adjacent to a similar metering station that will be constructed for the Bighorn project.

Process water for the Ivanpah Energy Center would be provided through a pipeline from a water treatment facility that would be located on State of Nevada land that is near the SNCC. Well #52732/52735, located near the SNCC (proposed for use by the project proponent), would provide a supplemental water source, should gray water flows from the SNCC become insufficient to meet plant needs. The pipeline would parallel the east side of the UPRR ROW to the plant site or parallel the UPRR ROW to, and be co-located within BLM-designated Utility Corridors to the plant site.

Plant access would be provided using Reliant's paved access road that extends from Wells Road to the plant site. Reliant Energy is constructing a grade-separated crossing over the UPRR ROW; however, an at-grade crossing that is currently in use for construction traffic for the Bighorn facility is likely to remain in place for future use requiring the transport of heavy loads.

Visual impacts associated with construction and operation of the Ivanpah Energy Center at the Primm Site would be similar to those associated with construction and operation of the Reliant Bighorn facility. Although the Ivanpah Energy Center would be visible from I-15, it would be screened from many views by the Reliant Bighorn facility which would be located west of the proposed plant site.

Construction and operation of the Ivanpah Energy Center at the Primm Site would require the installation of interconnecting transmission lines in a configuration that would be similar to that described for the Goodsprings Site. However, some modifications were made to reduce circuit lengths and related construction costs and impacts. One circuit would be required from the Ivanpah Energy Center to Mead Substation (Ivanpah-Mead Transmission Line) and one circuit would be required to Table Mountain Substation (Ivanpah-Table Mountain Transmission Line). Double-circuit construction would be used to reduce structure numbers and corridor width requirements. The Table Mountain Substation would be modified to accommodate an interconnection with the existing VEA Pahrump-Mead Transmission Line.

Benefits and potential impacts associated with the Primm Plant Site (Alternative F) are summarized in Table 3-6. Factors considered among all plant site alternatives are summarized in Table 3-7.

Table 3-6 Plant Site Alternative F

Plant Site Alternative F Primm Site	
Natural gas interconnect from KRGT to Primm Site.	3.2-mile-long natural gas supply pipeline, parallel to the Bighorn natural gas pipeline.
Ivanpah-Mead Transmission Line	40- to 41-mile-long single-circuit (primarily within BLM-designated utility corridors), crossing the McCullough Range and Eldorado Valley.
Ivanpah-Table Mountain Transmission Lines	13- to 16-mile-long single-circuit transmission line, primarily within a BLM-designated Utility Corridor.
Water supply pipeline	10.9- to 13.6 miles long, primarily parallel to UPRR or within proposed transmission line corridors.
Plant site access.	Access using Reliant Bighorn's paved road. Alternative access not required.
Visual impacts	Plant site would be visible from I-15. Presence of the Bighorn facility would screen the plant from some views. Transmission line visual impacts would be similar to those of the Proposed Goodsprings Plant Site (Alternative E).
Construction access	Adequate access from I-15 (Primm Interchange); Access to plant site via Reliant Bighorn Power Plant main road.
Transportation safety issues	Use of grade-separated crossing at the UPRR would reduce the potential for accidents.
Other factors	A portion of the plant site is currently partially zoned for heavy industrial use. Site is in an industrial setting.

Table 3-7 Summary of Plant Site Locations

	Plant Site Alternative A South of Jean in a BLM Utility Corridor.	Plant Site Alternative B Near a BLM-designated Utility Corridor and the KRGT Pipeline Corridor	Plant Site Alternative C Near the Proposed Table Mountain Substation site.	Plant Site Alternative D West of I-15, Near Mile Posts 5 to 7.	Plant Site Alternative E Proposed Goodsprings Site	Plant Site Alternative F Primm Site
Natural Gas Interconnect	Approximately 7.5 to 12.0 miles long, crossing under the UPRR and I-15 ROWs.	Minimal distance to plant site.	3.7 mile long pipeline required	1.0 mile long pipeline required	Minimal distance to plant site. Metering station would be constructed on IEC plant site.	Approximately 3.2 miles to plant site crossing under I-15 and the UPRR ROW; a 0.5-acre metering station needed at KRGT
Table Mountain Substation Interconnect	10.0 corridor miles, entirely within BLM-designated Utility Corridor. Crosses I-15 and UPRR ROW.	5.5 corridor miles, entirely within BLM-designated Utility Corridor.	Minimal distance	8.5 corridor miles, 4.5 miles of which would not be within BLM-designated Utility Corridor.	3.0 corridor miles of which 2.3 miles would be within BLM-designated Utility Corridors.	13 to 16 corridor miles, mostly within BLM-designated Utility Corridors.
IEC Substation to Mead Substation Transmission Line	33.0 to 35.0 miles long, entirely within BLM-designated Utility Corridor. Would not cross I-15 or UPRR ROW.	38 to 40 miles long, entirely within BLM-designated Utility Corridor. Would cross I-15 and UPRR ROW.	43 to 45 miles long, entirely within BLM-designated Utility Corridor. Would cross I-15 and UPRR ROW.	Approximately 40 miles long, including 4.5 miles that would not be within BLM-designated Utility Corridor. Would cross I-15 and UPRR ROW.	Approximately 43 miles long. Nearly all would be within a BLM-designated Utility Corridor. Would cross over I-15 ROW.	40 to 41 corridor miles, mostly within BLM-designated Utility Corridors. Would cross over I-15.
Water Supply Pipeline	5.0 miles long, primarily parallel to the UPRR ROW.	6.5 miles long, primarily parallel to the UPRR ROW and within BLM-designated Utility Corridor. Crosses under I-15 ROW.	11.5 miles long, primarily parallel to the UPRR ROW and within BLM-designated Utility Corridor. Crosses under I-15 ROW.	8.0 miles long, primarily parallel to the UPRR ROW, 4.5 miles of which would not be within BLM-designated Utility Corridor. Crosses under I-15 ROW.	Approximately 10.5 miles long, primarily parallel to the UPRR ROW and within BLM-designated Utility Corridor. Crosses under I-15 ROW.	Approximately 10.9 (parallel to UPRR ROW) or 13.6 miles long (parallel to UPRR ROW and co-located within transmission line corridor.
Plant Site Access	Good access along an existing county road.	Existing county roads would need improvement. Use of SR 161 and county roads could be an option.	Access restricted to SR 161 and Sandy Valley Road.	Improvements to an existing unimproved road from the south or construction of a new road from the north.	Improvements to an existing county road off SR 161, near the KRGT Compressor Station; improvements to existing county roads and a trail south and east of the plant site.	Existing access road to Reliant Bighorn Generating Facility. No additional access roads needed.
Visual Impacts	Relatively high visual impacts for the Table Mountain Substation Interconnection Transmission Line. Relatively high visual impacts from Jean and I-15.	Electrical Interconnection to Table Mountain Substation would result in relatively low visual impacts. Impacts of the plant site from Jean and I-15 would be relatively high	Very high visual impacts along Sandy Valley Road	New "industrial" features would be introduced to an area that is relatively undisturbed desert. Relatively high visual impacts along I-15 for the plant and transmission lines.	Minimal visual impacts because much of the plant would be screened from views from SR 161 and other locations by topographic features. The plant would be readily visible from one residence.	Minimal visual impacts because much of the plant would be screened from views from I-15 by the Reliant Bighorn Generating Facility. Impacts at transmission line crossings would be similar to those constructed for the Goodsprings Plant Site.
Transportation Safety	Minimal access and highway safety problems associated with movement of heavy loads during construction.	Minimal access and highway safety problems associated with movement of heavy loads during construction, if use of SR 161 can be avoided.	Access along SR 161 and Sandy Valley Road could result in traffic safety issues, primarily during construction.	If the Primm/I-15 interchange is used, access through private property would be required. Access from the Jean/I-15 interchange would require construction of a new gravel road parallel to I-15.	Access along SR 161 could result in traffic safety issues during construction. County roads and a trail could be improved and used to provide access from the south, thus minimizing potential impacts to traffic along SR 161.	Access along Wells Road and the existing road to the Reliant Bighorn Generating Facility.
Other Environmental Considerations	Likely to conflict with some off-road racing events and a BLM grazing allotment.	Located within the Desert Tortoise Translocation Area	Relatively close to Goodsprings and residences.	Located within the Desert Tortoise Translocation Area	Relatively close to Goodsprings residences (2.5 miles) and the KRGT Goodsprings Compressor Station (0.4 miles).	Co-located on industrial use property, a portion of which is zoned for heavy industrial use.
Construction Access	Good access along an unimproved county road.	Good access along an unimproved county road.	No reasonable alternative access routes are available	No reasonable alternative access routes are available.	Potential safety issues could be minimized by improving and using existing unimproved county roads during construction.	Access along Wells Road and the existing road to the Reliant Bighorn Generating Facility, which includes a gated at-grade crossing at the UPRR ROW.

3.4 SUMMARY OF PROJECT COMPONENTS

The Proposed Goodsprings Plant Site and the Primm Plant Site Alternative were carried forward for further evaluation. The Proposed Goodsprings Plant Site and a large portion of ancillary facilities for the plant (access roads, natural gas pipeline, telecommunications line, water supply pipeline, transmission lines, *etc.*) would be on federal land, administered by the Bureau of Land Management, Las Vegas Field Office. The Primm Plant Site Alternative is on private lands; transmission lines, the natural gas supply pipeline, and the water supply pipeline would be on BLM lands. If the project were approved, the BLM would issue right-of-way grants for the use of federal lands.

3.4.1 Proposed Goodsprings Plant Site

The Proposed Goodsprings Plant Site (Application Serial No. N-75493) would be located on an approximately 30-acre parcel, adjacent to the existing Kern River Gas Transmission (KRGT) pipeline corridor. An additional 10 acres that adjoins the 30-acre plant site would be acquired as a temporary laydown area for use during construction. The laydown area would be restored in accordance with BLM restoration requirements and returned to the BLM following plant construction and restoration of the laydown area. The plant site area is shown on Figure 3-3. Plant components are shown on Figure 3-4.

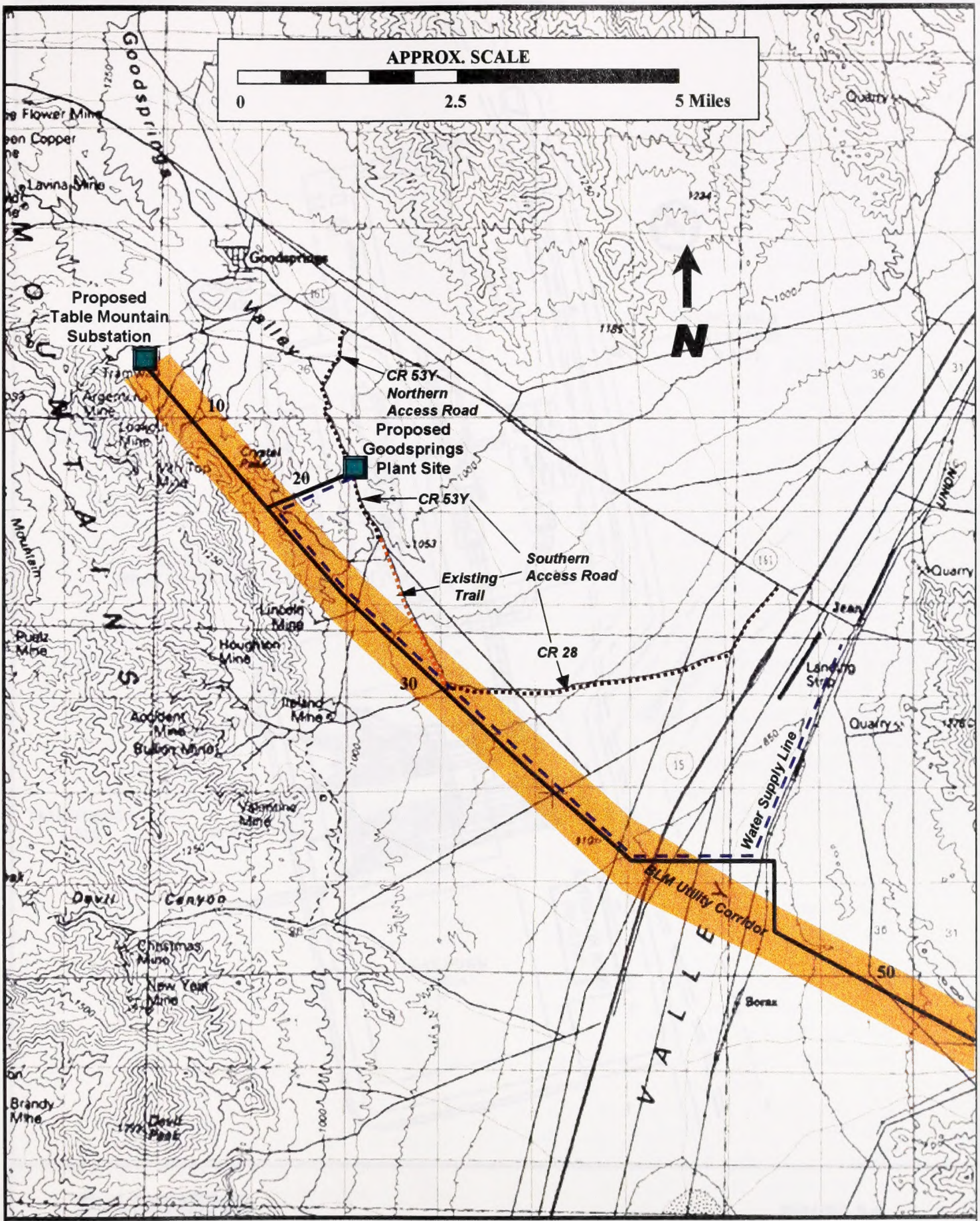
Ivanpah Energy Center would use two Westinghouse 501FD-60 Hz natural gas-fired combustion turbine generators (CTG) with heat-recovery steam generators that would capture exhaust heat. A heat recovery system would be used to supply steam to drive a single steam turbine generator (STG). Nominal net generating capacity of the combined cycle system would be approximately 500 MW. Each of the combustion turbines would be equipped with dry low NO_x combustors and Selective Catalytic Reduction (SCR) ammonia injection systems to control emissions of NO_x. In addition, a Non-selective Catalytic Reduction (NSCR) unit would be used to control emissions of carbon monoxide (CO) and volatile organic compounds (VOC). Full load output of the unit under expected operating conditions (both CTGs and the STG running) would range from approximately 450 net MW to a peak of 540 net MW, depending on the ambient air temperature. The plant can also operate at partial load with one or both CTGs running at minimum load and reduced STG output. Operational modes will be dictated by energy demand and market price.

The facility would be designed to use an air-cooled condenser, in a process that is referred to as dry cooling, to condense and reuse spent steam from the steam turbine. Dry cooling technology has been proposed for most, if not all, gas turbine power plants in Clark County and typically reduces water usage by 90 percent or more from that used by wet cooling methods. The use of dry cooling technology for a 500 MW combined-cycle (as proposed by the project proponent) typically reduces cooling water consumption from approximately 3,000 acre-feet per year (afy) to about 300 afy. Further water usage reduction would be achieved through the use of refrigerated air technology in which inlet air to the gas turbines would be cooled using mechanical refrigeration, rather than evaporative cooling. Refrigeration cooling of the inlet air

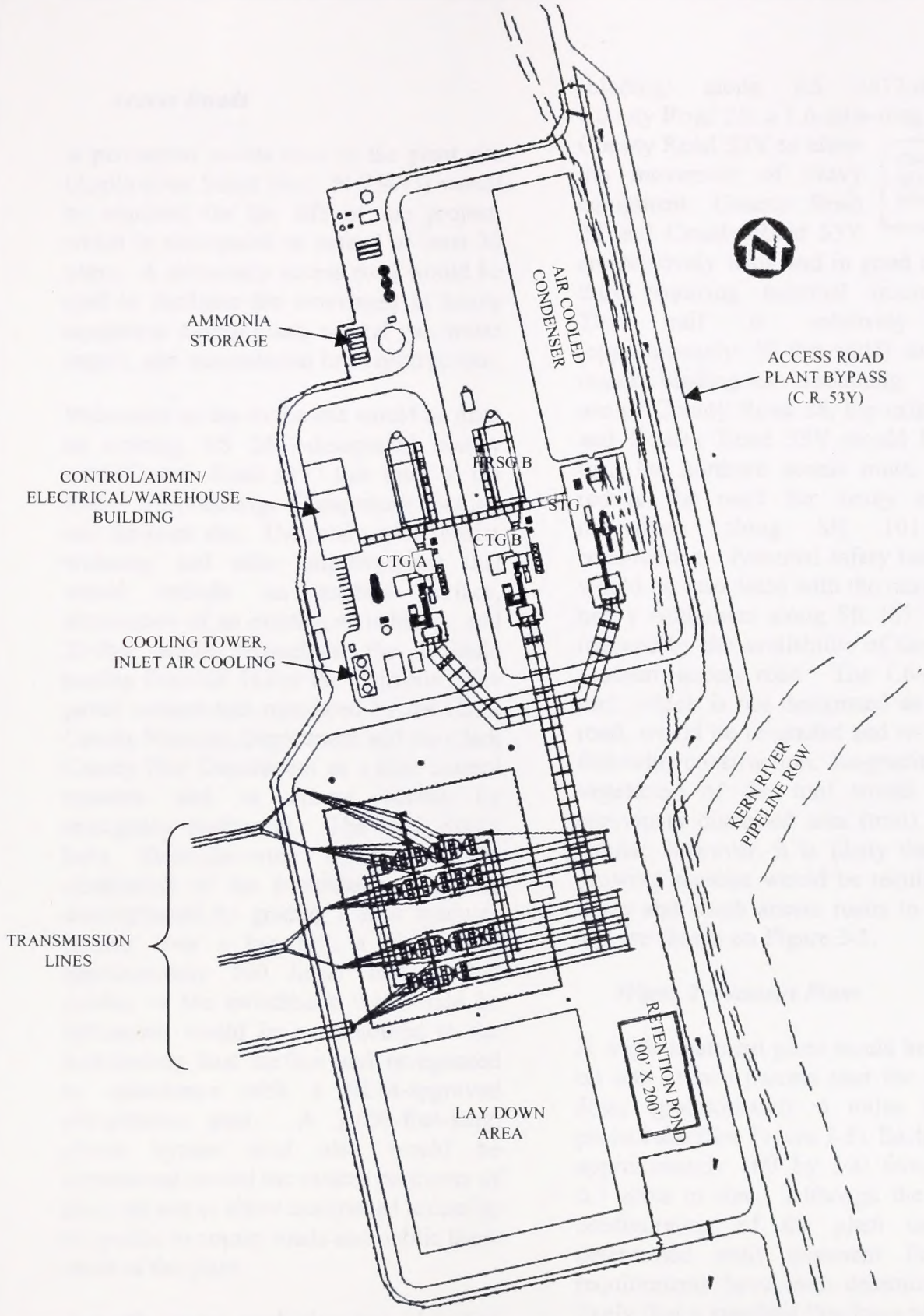
increases inlet air density, thus increasing turbine power output. The combination of dry cooling and refrigerated air-cooling would reduce water requirements at the Ivanpah Energy Center to 50 afy, or less.

Natural gas would be provided from the KRGT pipeline via a 12-inch-diameter pipeline to the plant site property (Application Serial No.: N-75471). Although the pipeline could be as long as 500-foot-long, the area crossed is likely to be within KRGT ROW and plant property. Metering for the pipeline would be installed on the plant site. Kern River pipeline is the only natural gas supply source in the northern Ivanpah Valley. Therefore, no alternative pipeline routes or sources were identified.

A 7,200-foot-long telecommunications line would be installed from an existing Sprint Communications line that presently serves the KRGT Compressor Station (Application Serial No.: N-75895). The compressor station is approximately 2,000 feet north of the Proposed Goodsprings Plant Site. The new line would be installed underground from the existing line to the shoulder of the improved north access road, a distance of approximately 1,400 feet. Installation of the line would temporarily disturb a 25-foot-wide area along the 1,400-foot-long corridor to the access road (0.8 acres). A 10-foot-wide permanent ROW would be established throughout 7,200-foot line length (1.7 acres). No alternative telecommunications sources or lines were identified.



PARSONS **IVANPAH ENERGY CENTER PROJECT** **FIGURE 3-3 PROPOSED GOODSPRINGS PLANT SITE AREA**



PARSONS
SITE LAYOUT BY
Harris Group Inc.

IVANPAH ENERGY CENTER PROJECT

FIGURE 3-4
PROPOSED GOODSPRINGS PLANT SITE LAYOUT

Access Roads

A permanent access road to the plant site (Application Serial No.: N-75493) would be required for the life of the project, which is anticipated to extend at least 30 years. A secondary access road would be used to facilitate the movement of heavy equipment during plant, natural gas, water supply, and transmission line construction.

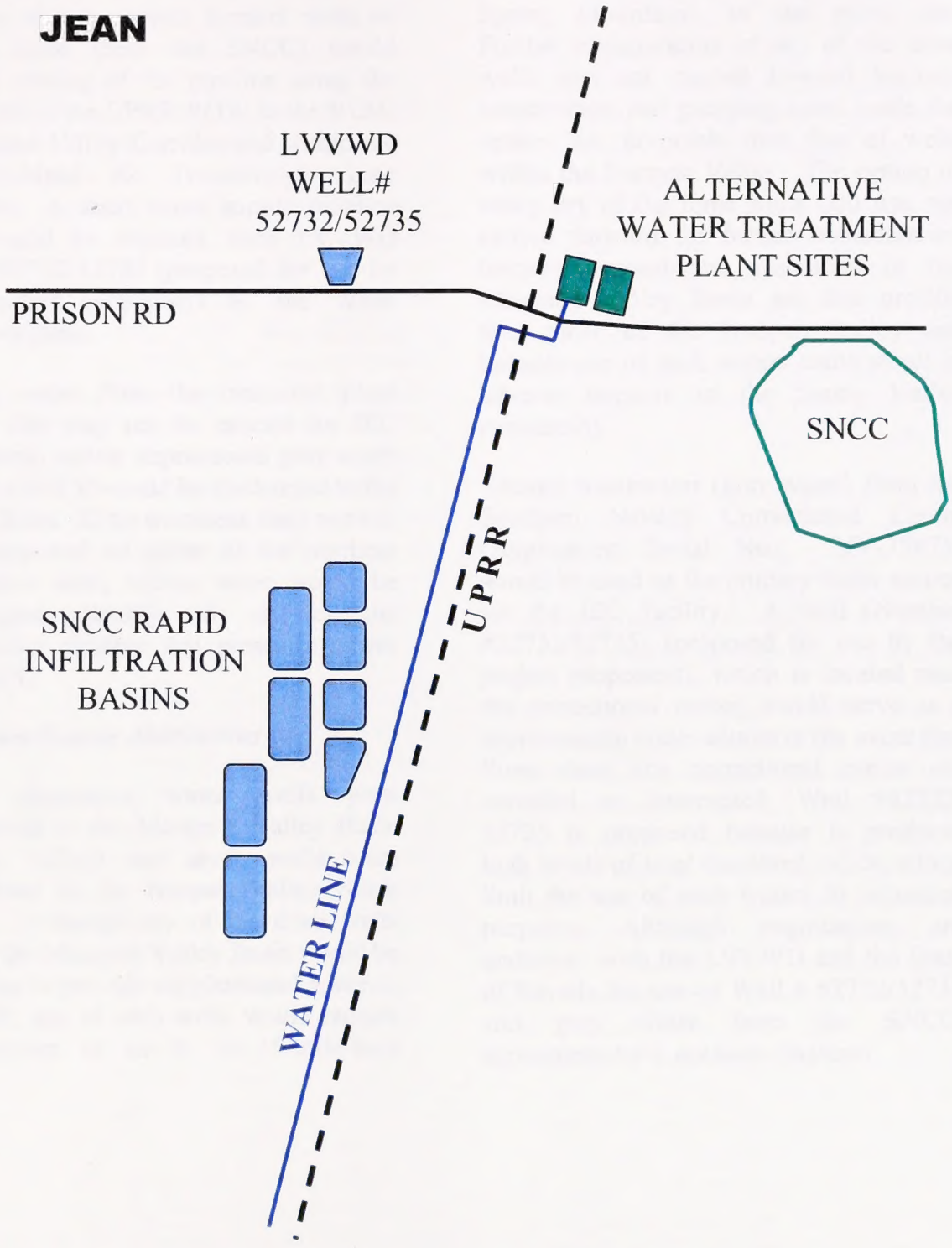
Permanent access to the site would be from an existing RS 2477-designated county road (County Road 53Y) that leads to the KRGT Goodsprings Compressor Station and the plant site. The road would require widening and other improvements that would include an asphalt surface, elimination of an existing switchback, and 20-foot width throughout the 1.5-mile portion from SR 161 to the plant site. The paved surface was mandated by the Clark County Planning Department and the Clark County Fire Department as a dust control measure and to ensure access by emergency equipment. The road would have three-foot-wide shoulders. The elimination of the switchback would be accomplished by grading a new roadway directly over a low hill, a distance of approximately 500 linear feet. That portion of the switchback that would be eliminated would be re-contoured to the surrounding land surface and revegetated in accordance with a BLM-approved revegetation plan. A 2,000-foot-long, gravel bypass road also would be constructed around the eastern perimeter of the plant site to allow unimpeded access by the public to county roads and public lands south of the plant.

A south access road also was identified that would enable the movement of heavy equipment during construction. The alternative would require improvements (blading) along RS 2477-designated County Road 28, a 1.6-mile-long trail, and County Road 53Y to allow the movement of heavy equipment. County Road 28 and County Road 53Y are relatively wide and in good condition, thus requiring minimal improvements. The trail is relatively narrow (approximately 10-feet-wide) and would require blading and smoothing. Although use of County Road 28, the existing trail, and County Road 53Y would be longer than the northern access route, it would reduce the need for heavy equipment movement along SR 161 during construction. Potential safety hazards that would be associated with the movement of heavy equipment along SR 161 would be reduced by the availability of the alternate southern access road. The 1.6-mile-long trail, which is not designated as a county road, would be re-graded and re-vegetated following construction. Re-grading and re-vegetation of the trail would return a previously disturbed area (trail) to native habitat; however, it is likely that several growing seasons would be required. The north and south access roads to the plant site are shown on Figure 3-3.

Consideration of alternative access roads.

Water Treatment Plant

A water treatment plant would be installed on one of two parcels near the SNCC at Jean, approximately 6 miles from the project site (See Figure 3-5). Each parcel is approximately 100 by 300 foot, totaling 0.7 acres in size. Although the size and configuration of the plant cannot be determined until treatment flows and requirements have been determined, it is likely that a standard "package plant" will be selected for the project. A 200 horsepower electric pump also would be installed as part of the treatment facility.



Sketch Not Drawn To Scale

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FIGURE 3-5
ALTERNATIVE WATER TREATMENT PLANT SITES
(PROPOSED GOODSPRINGS SITE)

Construction of the water treatment plant on one of two parcels located north of Prison Road (near the SNCC) would require routing of the pipeline along the west side of the UPRR ROW to the BLM-designated Utility Corridor and within the Ivanpah-Mead #2 Transmission Line corridor. A short water supply pipeline also would be required from LVVWD Well #52732/52735 (proposed for use by the project proponent) to the water treatment plant.

Excess water from the treatment plant (water that may not be needed for IEC operations) and/or unprocessed gray water from the SNCC would be discharged to the SNCC RIBs. If the treatment plant were to be constructed on either of the northern alternative sites, excess water would be discharged directly to an existing wastewater pipeline that presently serves the SNCC.

Water Source Alternatives

Three alternative water wells were considered in the Mesquite Valley Basin (Sandy Valley) and seven wells were considered in the Ivanpah Valley North Basin. Although any of the three wells within the Mesquite Valley Basin would be adequate to provide supplemental water to the IEC, use of such wells would require construction of an 8- to 10-mile-long pipeline from Sandy Valley, across the Spring Mountains, to the plant site. Further consideration of any of the three wells was not carried forward because construction and pumping costs made the option less favorable than that of wells within the Ivanpah Valley. The option of using any of the three wells also was not carried forward for further consideration because groundwater resources in the Mesquite Valley Basin are less prolific than those of the Ivanpah Valley and because use of such waters could result in adverse impacts to the Sandy Valley community.

Treated wastewater (gray water) from the Southern Nevada Correctional Center (Application Serial No.: NV-75475) would be used as the primary water source for the IEC facility. A well (Number #52732/52735) (proposed for use by the project proponent), which is located near the correctional center, would serve as a supplemental water source in the event that flows from the correctional center are curtailed or interrupted. Well #52732/52735 is proposed because it produces high levels of total dissolved solids, which limit the use of such waters to industrial purposes. Although negotiations are underway with the LVVWD and the State of Nevada for use of Well # 52732/52735 and gray water from the SNCC, agreements have not been finalized.

Water Supply Pipeline Route Alternatives

Two pipeline routes (Alternatives A and B) from the water treatment plant to the IEC plant site were identified as viable alternatives. One route (Alternative A) would parallel the UPRR ROW to the south and would be located within the proposed IEC to Mead Transmission Line corridor. The corridor would parallel the existing VEA 230 kV Pahrump-Mead Transmission Line that is within a BLM-designated Utility Corridor (Application Serial No.: N-75471).

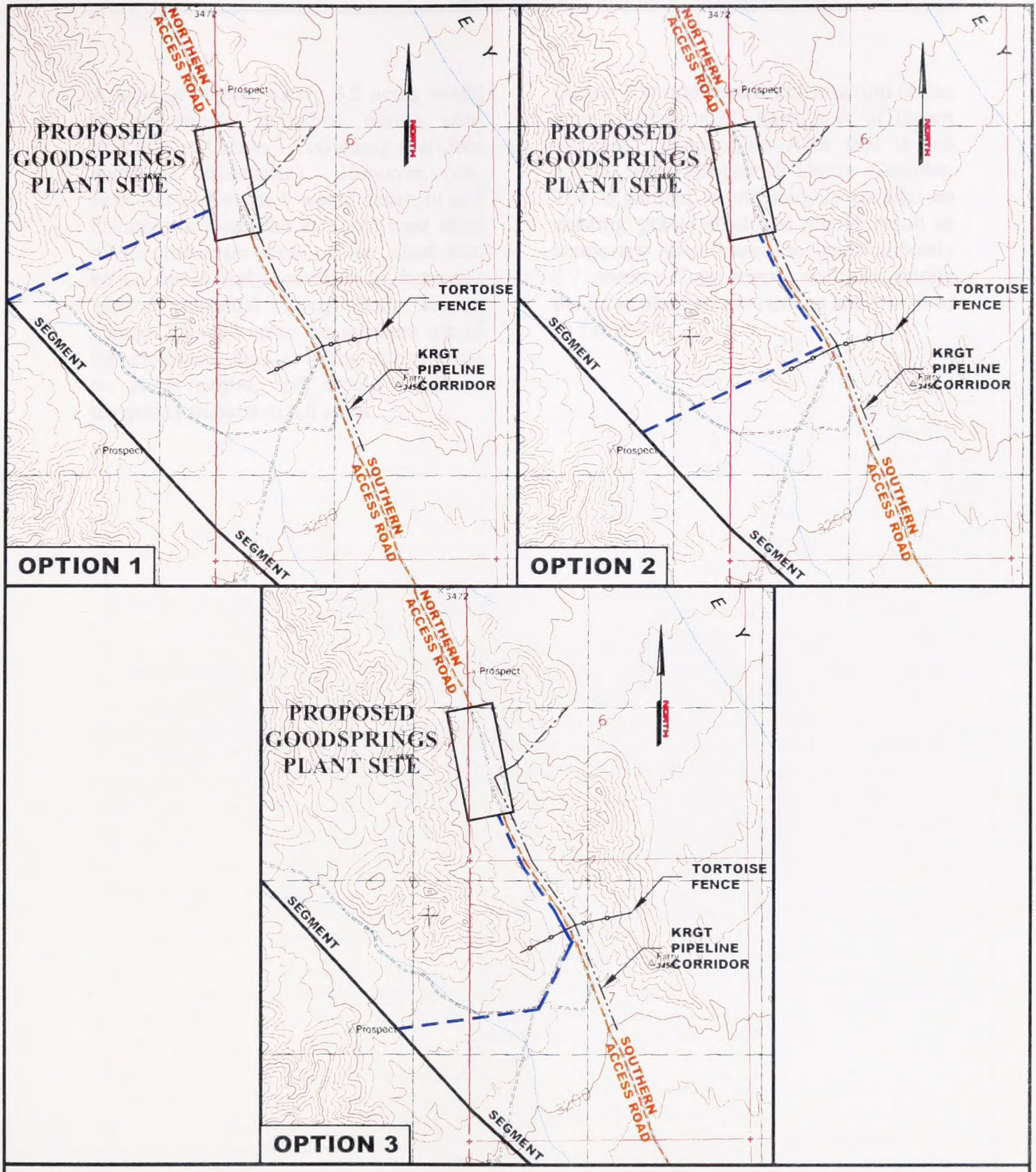
Construction within the Utility Corridor could place the new pipeline at the northern margin of the BLM-designated Utility Corridor (Option 1) or within the proposed 100-foot-wide Ivanpah-Mead Transmission Line corridor (Option 2).

If Option 1 were to be used, it would result in temporary disturbance within a 40-foot-wide, 6.5-mile-long alignment that would be approximately 1,200 feet from the area that has been previously disturbed by construction of the Reliant Bighorn-Arden Transmission Line and the area that would be disturbed by construction of the Ivanpah-Mead Transmission Line. Although separation of the pipeline from the transmission lines would aid in establishing separate corridors that could be used to "group" existing and future transmission lines and pipelines, it would result in greater temporary disturbance than that of an alignment that would be located within the proposed transmission line corridor (Option 2). Construction along a separated corridor (Option 1) would result in approximately 31.5 acres of temporary disturbance along a 40-foot-wide, 6.5-mile-long swath across Ivanpah Valley. Although construction of the pipeline would result in a temporary disturbance, impacts and restoration requirements associated with Option 2 would be less than that of Option 1. Therefore, an alignment that would be within the proposed Ivanpah to Mead Transmission Line (Ivanpah-Mead #2 Transmission Line) corridor was carried forward for further consideration.

An alternative route (Alternative B) that would extend west from the water treatment plant and along SR 161 to the main entrance of the plant was proposed but eliminated from further consideration due to jurisdictional conflicts with existing and planned development in the Jean area and because it would not be within a BLM-designated Utility Corridor.

Water Supply Plant Site Access Options

Three plant site access routes were considered for construction of the pipeline, near the Goodsprings plant site. Option 1 would parallel the proposed transmission line to the point of interconnection with lines originating from the plant and then turn to the east and cross rugged terrain, over a mountain (Mira Mountain) to the plant site. Option 2 would remain within lowlands, around the southern toe of the mountain (north of the existing Desert Tortoise Fence), and continue to the north, paralleling the west side of County Road 53Y and KRGT pipeline corridor to the plant site. Option 3 would depart from the BLM-designated Utility Corridor near that of Option 2 and parallel an undesignated gravel road around the toe of the mountain. The alignment would then parallel the west side of County Road 53Y and the KRGT pipeline corridor to the plant site. The three options are shown on Figure 3-6.



OPTIONS LEGEND

— — — — WATER SUPPLY LINE OPTION

GRAPHIC SCALE
1350 0 675 1350 2700
(IN FEET)

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FIGURE 3-6
WATER SUPPLY ACCESS OPTIONS TO PROPOSED GOODSPRINGS PLANT SITE

A total of approximately 3.8 acres would be temporarily disturbed during construction of Option 1 (assuming a 40-foot width of disturbance). However, construction of Option 1 would result in soil disturbance along the east and west sides of the mountain west of the plant site, which would likely contribute to, increased erosion potential along both slopes. Option 2 would cross the southern toe of the mountain, thus avoiding construction on steep slopes, and would result in temporary impacts to 6.0 acres.

Option 3 would require construction across approximately 4,225 linear feet of Desert Tortoise Translocation Area that is not within BLM-designated Utility Corridor. The alignment would roughly parallel an existing gravel road and would result in temporary disturbance to approximately 6.7 acres. Comparative analyses among the three plant access options are described in Table 3-8.

Table 3-8 Proposed Goodsprings Plant Site Access Options

Proposed Goodsprings Plant Site Access Options Water Supply Pipeline			
	Option 1 **Across the Mountain West of the Plant Site**	**Option 2** **Across the Toe of the Mountain and North of Desert Tortoise Fence**	**Option 3** **Around the Toe of the Mountain, Parallel to an Existing Gravel Road**
Pipeline Length (feet from VEA Corridor)	4,200 linear feet	6,560 linear feet	7,280 linear feet
Acres Temporarily Disturbed[1]	3.9 acres	6.0 acres	6.7 acres
Pipeline Length through Desert Tortoise Translocation Area (feet)[2]	None		4,225 linear feet
Construction Factors	Construction on very steep slopes	Construction on relatively level terrain.	
Ecological Factors	Not within the Desert Tortoise Translocation Area[3]		Approximately 4,225 linear feet within the Desert Tortoise Translocation Area[4]
Visual Impacts	Trenching over the western mountain would result in temporary visual impacts that are not associated with Options 2 or 3.	Trenching across or around the toe of the mountain would be minimally visible to the general public.	
Restoration	Difficult and may not be entirely effective due to steep slopes.	Restoration would be on relatively level ground. Difficulties associated with restoration are not anticipated.	
Other Factors	Pumping and related costs would be greater than those of Option 2 or 3.	Pumping requirements (and related costs) would be less than that of Option 1 because elevation changes are minimal.	

[1] Estimated based on 40-foot-wide construction corridor.

[2] Does not include BLM-Utility Corridor within Desert Tortoise Translocation Area.

[3] North of Desert Tortoise Translocation fence.

[4] South of Desert Tortoise Translocation fence.

Alternative Transmission Line Interconnections and Routes

An interconnection with Valley Electric Association facilities at Mead Substation was selected as appropriate because it is presently used by VEA for 230 kV transmission service and because it has the capacity necessary to handle power loads that would be generated from the IEC facility and Table Mountain Wind Farm (Application Serial No.: N-75471). Interconnections to substations, use of existing transmission lines, and new transmission lines are reviewed and approved by the State of Nevada Public Utility Commission and potentially affected utility companies. Interconnections to the VEA system have been evaluated to ensure system reliability within the southern Nevada utility grid.

A 230 kilovolt (kV) single-circuit transmission line (Ivanpah-Mead #2) would be constructed from the Ivanpah Energy Center Substation to the Mead Substation, a distance of approximately 43 miles (Application Serial No.: N-75471). Several potential alternative transmission line routes were identified and analyzed; two routes were evaluated in detail.

Four plant site access options also were evaluated to identify suitable routes for the five circuits that would enter the Ivanpah Energy Center Substation. The five interconnecting circuits would serve Ivanpah-Mead Transmission Lines #1 and #2, the Pahrump-Mead Transmission Line, and Ivanpah-Table Mountain Transmission Lines #1 and #2.

Three of the four plant access options are similar to those considered for the water supply pipeline; the fourth option represents a combination of two options. The proposed water supply pipeline would parallel the selected transmission line option.

An analysis was carried out to evaluate relative differences among potential alternative transmission line routes between the Ivanpah Energy Center Substation and Mead Substation that would be used for the proposed Ivanpah-Mead Transmission Line #2. The existing line (currently the Pahrump-Mead Transmission Line) would remain in place and would be redesignated as Ivanpah to Mead #1 (Application Serial No.: N-57100).

Linear features, consisting of existing electric transmission lines, natural gas and other pipelines, major roads and highways, section lines, and BLM-designated utility corridors were identified as siting opportunities. Siting constraints that were considered included: special use areas, property ownership patterns, recreational use areas, and sensitive visual receptors. The analysis also considered the reconfiguration of existing transmission lines in the project area to modify them for project use and various structure types that could be used to reduce environmental impacts. Routing opportunities and constraints are summarized as follows:

Siting Opportunities	Siting Constraints
• Parallel to existing transmission lines • Parallel to natural gas or other pipelines • Parallel to major roads/highways/railroads • Within BLM-designated Utility Corridors	• Avoidance of areas that are developed or are to be developed • Avoidance of areas that are known to have special status species or species of concern • Avoidance of areas that are known to have important cultural resources • Avoidance of recreation management areas. • Avoidance of Wilderness Study Areas or Wilderness Management Areas. • Avoidance of existing or proposed airports. • Avoidance of extremes in topography and terrain that would constrain construction or access.

An evaluation of alternative transmission line routes was carried out by identifying a series of line segments that, in combination, would result in various potential transmission line route alternatives. The potential transmission line alternatives were then evaluated to eliminate those with segments that could not be constructed or those that were clearly unsuited for further consideration.

A route that would parallel a portion of the Reliant Bighorn-Arden Transmission Line and parallel a portion of the Arden-McCullough Transmission Line was evaluated to determine if it is suitable for project needs. Although the route would avoid crossing the McCullough Range, it was eliminated from further consideration because nearly three miles would cross undisturbed desert on BLM managed land that is absent of linear features. Furthermore, none of the route would be within BLM-designated Utility Corridors, a large portion of the line would parallel I-15 within an area that is currently absent of transmission lines, and a segment of the line would be highly visible from major residential areas in Henderson, Nevada. Construction of the line also could impact the North McCullough Mountains Wilderness Study Area. The study area is located near areas that are undergoing extensive residential development and includes crucial desert bighorn sheep habitat (BLM, 2001).

Potential transmission line corridors that cross the Ivanpah Valley and are being used by the existing VEA Pahrump-Mead Transmission were considered to be suitable for project purposes. The corridors extend through the McCullough Range, through McCullough Pass and an unnamed pass to the north. The corridors continue to the east, east of the McCullough Range, and through Eldorado Valley to Mead, McCullough, and Eldorado Substations. Fourteen potential transmission line segments were identified, based on the

above referenced criteria and labeled as segments 10, 20, ... through 140. The segments, described in Table 3-9 and shown on Figure 3-7.

The following 12 potential transmission line routes (designated as Alternatives A, B, ... through L) were identified through combinations of the 14 route segments.

- Alternative A – Segments 30, 50, 70, 100, 130, 140
- Alternative B – Segments 30, 50, 70, 80, 90, 120, 140
- Alternative C – Segments 30, 50, 60, 90, 120, 140
- Alternative D – Segments 30, 50, 60, 80, 100, 130, 140
- Alternative E – Segments 30, 50, 60, 90, 110, 130, 140
- Alternative F – Segments 30, 50, 70, 80, 90, 110, 130, 140
- Alternative G – Segments 40, 50, 70, 100, 130, 140
- Alternative H – Segments 40, 50, 70, 80, 90, 120, 140
- Alternative I – Segments 40, 50, 60, 90, 120, 140
- Alternative J – Segments 40, 50, 60, 80, 100, 130, 140
- Alternative K – Segments 40, 50, 60, 90, 110, 130, 140
- Alternative L – Segments 40, 50, 70, 80, 90, 110, 130, 140

Alternatives A through F would exit the Ivanpah Substation from the west or southwest and extend to the existing VEA 230 kV Pahrump-Mead Transmission Line corridor. Segment 20 of the alternatives would consist of five circuits, two of which would interconnect with the proposed Table Mountain Substation (Ivanpah-Table Mountain #1 and #2), two would interconnect with the existing VEA Pahrump-Mead Transmission Line (Pahrump-Ivanpah and Ivanpah-Mead #1), and one would terminate at Mead Substation, in the Eldorado Valley (Ivanpah-Mead #2). The interconnection is shown schematically on Figure 3-8.

Alternatives G through L would exit the IEC Substation from the north, parallel the northern access road to the IEC facility and the KRGT Goodsprings Compressor Station to SR 161 (County Road 53Y). SR 161 would be paralleled along the north side to the vicinity of the new Reliant Bighorn-to-Arden Substation Transmission Line crossing and an existing NPC transmission line. The highway and the NPC transmission line would be paralleled to the existing Jean Substation where the NPC line and Segment 40 turn to the south along the western side of I-15. The alignment would then join Segment 50 west of the Interstate Highway and continue to the southeast.

One or more separate transmission line corridors would be required to interconnect the Ivanpah Substation to the proposed Table Mountain Substation and to interconnect the existing Pahrump-Mead Transmission Line, as described in Alternatives A through F. Although additional engineering would be required to estimate corridor and circuit mile lengths that would be needed for the interconnections, they are likely to be similar to those needed for Alternatives A through F.

Table 3-9 Transmission Line Segment Description

Segment	Length (ft.)	Segment Description
10	17,000	Double-circuit transmission line from the proposed VEA/IEC interconnection corridor (Segment 20) to Table Mountain Substation. Segment 10 would loop through the proposed Table Mountain Substation that would be located on Sandy Valley Road which would result in 4.7 miles of circuit.
20	6,560	Interconnection corridor that extends from the IEC Substation to the VEA transmission line corridor. Two circuits would be used for the Table Mountain Loop Line, two circuits would connect directly from the IEC Substation to the existing VEA 230 kV single-circuit transmission line, and one circuit would turn to the south and terminate at the Mead Substation. The five circuits would be constructed on two double-circuit and one single-circuit structures which would result in 3.6 miles of circuit. Actual segment length would range from 4,200 to 7,280 linear feet, depending on plant site access.
30	27,900	Segment 30 represents an alternative to Segment 40. The segment begins at the Valley Electric Cooperative Pahrump-Mead 230 kV Transmission Line corridor, southwest of the Ivanpah Energy Center. Segment 30 extends to the southeast, paralleling the north side of the VEA corridor and crosses the new Reliant (NPC) Bighorn-Arden Transmission Line where the NPC line turns to the north. The segment joins Segments 40 and 50, west of I-15.
40	58,400	Segment 40 represents an alternative to Segment 30. Segment 40 exits the IEC from the north and roughly parallels the existing access road to the plant before crossing SR 161 and turning to the east. The north side of SR 161 is paralleled approximately 10,500 feet before the line crosses the new Reliant Energy Bighorn-Arden Transmission Line and parallels an existing triple-circuit transmission line along SR 161 to the Jean Substation. The segment continues to parallel the NPC transmission line corridor and the I-15 corridor before joining Segments 30 and 50. Note, if Segment 40 were to be constructed, a double-circuit line from the IEC Substation to Table Mountain Substation would continue to be required.
50	25,900	Segment 50 parallels the north side of the new Bighorn-Arden Transmission Line corridor, crosses the Union Pacific Railroad, and continues in a southeasterly direction to join Segments 60 and 70. The existing VEA Pahrump-Mead 230 kV Transmission Line that is north of the proposed Ivanpah Airport would be moved to the north to reduce potential conflicts with the new airport.
60	66,700	Segment 60 roughly parallels the existing VEA Pahrump-Mead Transmission Line and extends in a northeasterly direction from Segments 50 and 70, across Hidden Valley to a pass through the McCullough Range. The segment joins Segments 80 and 90 east of the McCullough Range. Segment 60 represents an alternative to Segment 70, which passes though McCullough Pass.
70	63,400	Segment 70 represents an alternative to Segment 60. Segment 70 would be north of several major transmission lines that cross McCullough Pass, toward Eldorado Valley. Segment 70 joins Segments 80 and 100, east of the McCullough Range.
80	1,400	Segment 80 is a short link that connects Segments 60, 70, 90, and 100. Segment 80 crosses the existing VEA Pahrump-Mead Transmission Line and several other transmission lines.
90	36,400	Segment 90 represents an alternative to Segment 100. Segment 90 parallels the north side of the existing VEA Pahrump-Mead Transmission Line corridor within a BLM-designated Utility Corridor from Segments 60/80 to Segment 120.

Segment	Length (ft.)	Segment Description
100	49,600	Segment 100 represents an alternative to Segment 90. Segment 100 parallels the north side of several transmission lines within a BLM-designated Utility Corridor from Segments 70 and 80 and crosses the southeastern portion of Eldorado Valley.
110	15,800	Segment 110 is a link between Segments 90/120 and 100/130. The alignment parallels the existing Pahrump-Mead Transmission Line, but is not within a BLM-designated Utility Corridor. The segment would cross under the following transmission lines near the western edge of Eldorado Valley: LADWP Intermountain – Adelanto 500 kV DC Transmission Line NPC Decatur – McCullough 230 kV Transmission Line NPC Mead – McCullough 230 kV Transmission Line (# 1) NPC Mead – McCullough 230 kV Transmission Line (# 2) LADWP Mead – Navajo 500 kV Transmission Line SCE Boulder – Chino 230 kV Transmission Line SCE 230 kV Transmission Line Lines that are along the eastern side of Eldorado Valley that would be crossed are: VEA Pahrump – Mead 230 kV Transmission Line SRP Mead – Phoenix 500 kV Transmission Line LADWP Mead – McCullough 500 kV Transmission Line (# 1) LADWP Mead – McCullough 500 kV Transmission Line (# 2) LADWP Mead – Victorville Transmission Line
120	61,300	Segment 120 is an alternative to Segment 130 and connects Segment 90 to Segment 140. The segment is within a BLM-designated Utility Corridor, parallels existing transmission lines, and is north of Eldorado Dry Lake. The segment crosses U.S. 95. Segment 120 would cross under the following transmission lines: LADWP Intermountain – Adelanto 500 kV DC Transmission Line NPC Decatur – McCullough 230 kV Transmission Line NPC Mead – McCullough 230 kV Transmission Line (# 1) NPC Mead – McCullough 230 kV Transmission Line (# 2) LADWP Mead – Navajo 500 kV Transmission Line SCE Boulder – Chino 230 kV Transmission Line SCE 230 kV Transmission Line
130	43,900	Segment 130 is an alternative to Segment 120 and connects Segments 100 to Segment 140. The segment is within a BLM-designated Utility Corridor, parallels existing transmission lines, and is south of Eldorado Dry Lake. The segment crosses U.S. 95.
140	10,500	Segment 140 is a short link from Segments 120 and 130. The corridor parallels the south side of several transmission lines within a BLM-designated Utility Corridor to Mead Substation. Segment 140 would cross under the following transmission lines, before continuing to the east and terminating at Mead Substation.

VEA Valley Electric Association
NPC Nevada Power Company
SRP Salt River Project
LADWP Los Angeles Department of Water and Power
SCE Southern California Edison

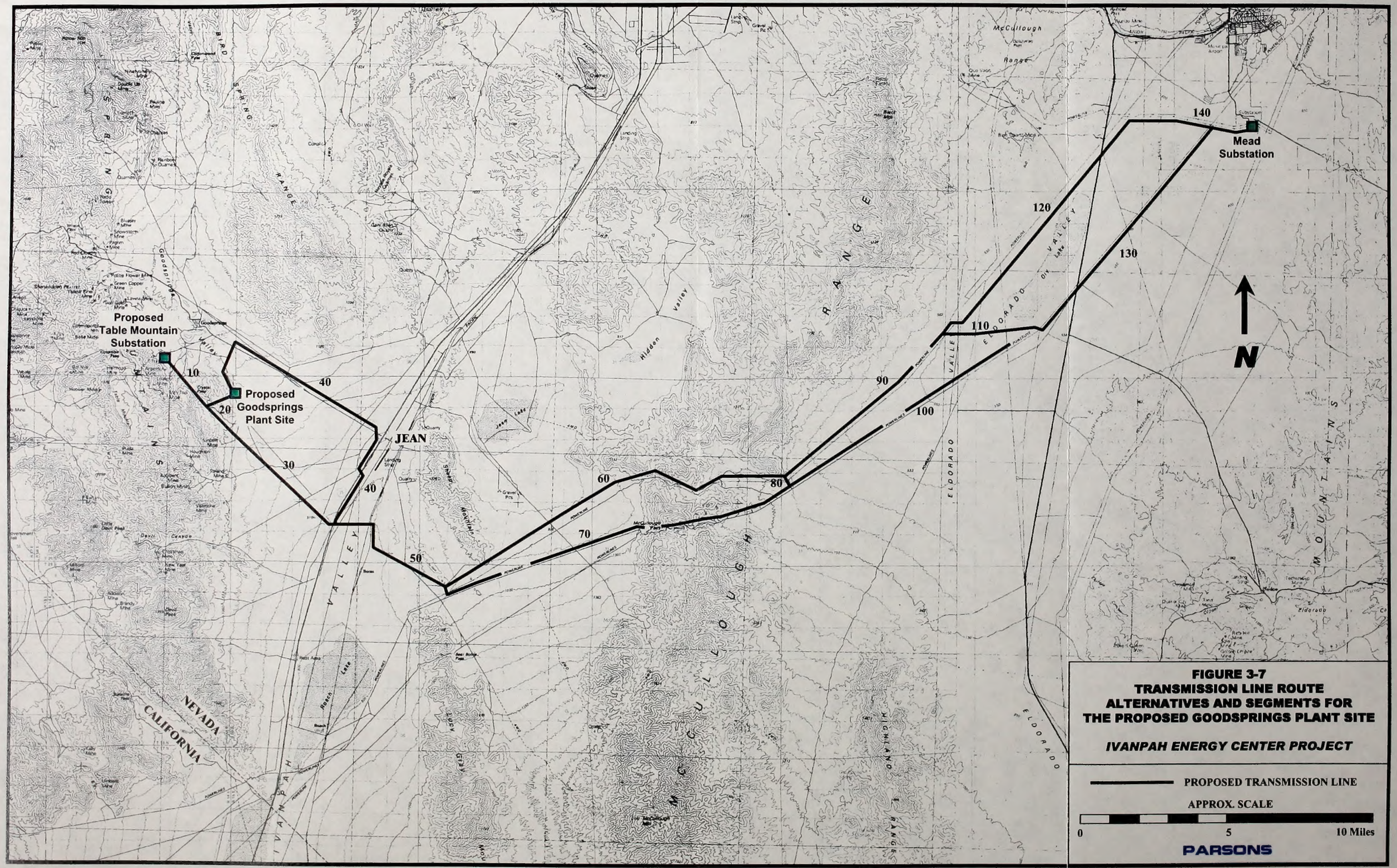


FIGURE 3-7
TRANSMISSION LINE ROUTE ALTERNATIVES AND SEGMENTS FOR THE PROPOSED GOODSPRINGS PLANT SITE

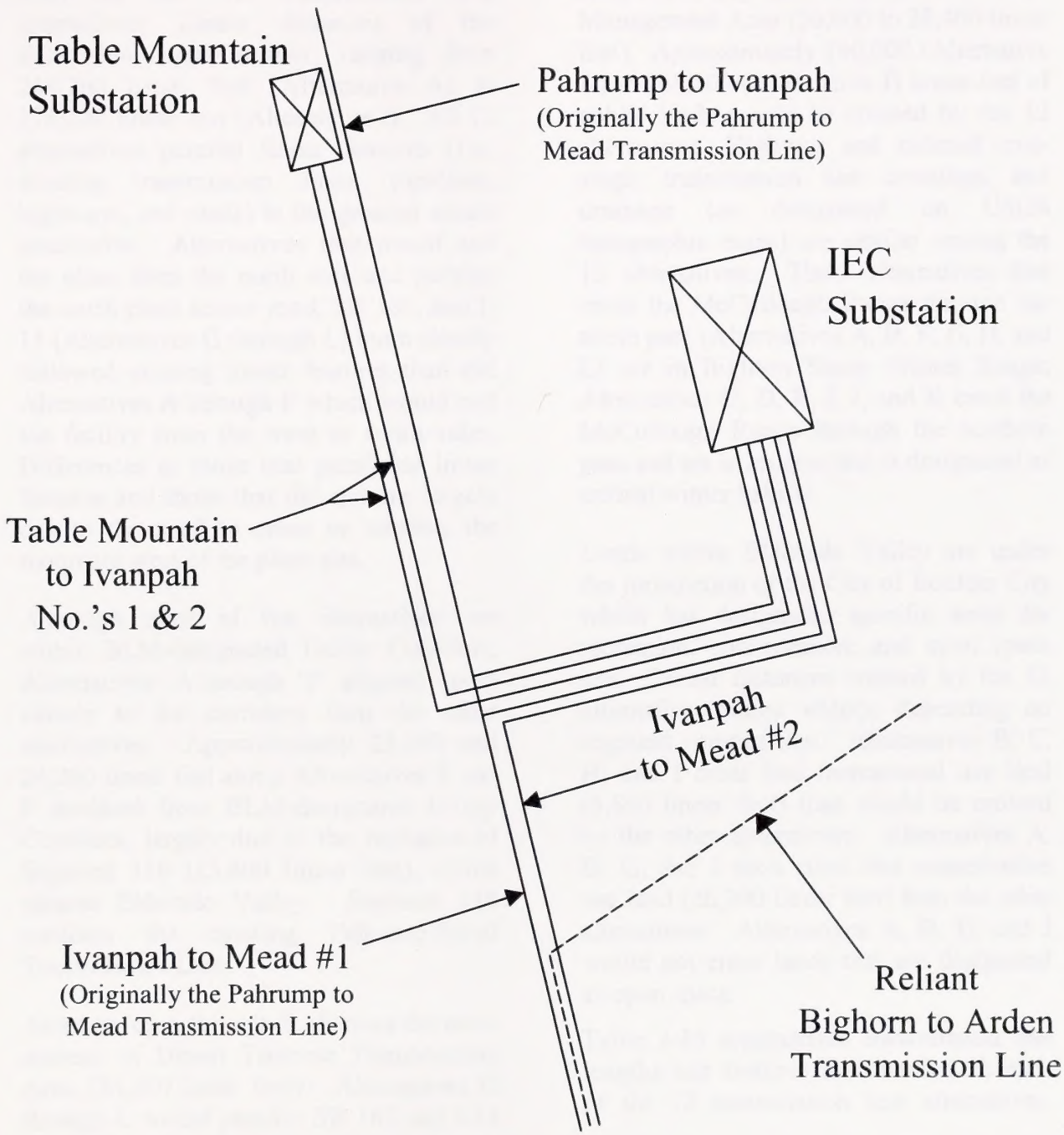
IVANPAH ENERGY CENTER PROJECT

PROPOSED TRANSMISSION LINE

APPROX. SCALE

0 5 10 Miles

PARSONS



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IVANPAH ENERGY CENTER PROJECT

FIGURE 3-8
SCHEMATIC OF TRANSMISSION LINE FROM PROPOSED GOODSPRINGS PLANT SITE TO TABLE MOUNTAIN SUBSTATION

Data were compiled to compare land uses and sensitive receptors that are crossed by each of the 12 transmission line alternatives. Linear distances of the alternatives were similar, ranging from 244,760 linear feet (Alternative A) to 276,200 linear feet (Alternative I). All 12 alternatives parallel linear features (*i.e.*, existing transmission lines, pipelines, highways, and roads) to the greatest extent practicable. Alternatives that would exit the plant from the north side and parallel the north plant access road, SR 161, and I-15 (Alternatives G through L) more closely followed existing linear features than did Alternatives A through F which would exit the facility from the west or south sides. Differences in those that paralleled linear features and those that did not are largely due to the need to cross or traverse the mountain west of the plant site.

Although most of the alternatives are within BLM-designated Utility Corridors, Alternatives A through F aligned more closely to the corridors than the other alternatives. Approximately 22,360 and 24,260 linear feet along Alternatives E and F deviated from BLM-designated Utility Corridors, largely due to the inclusion of Segment 110 (15,800 linear feet), which crosses Eldorado Valley. Segment 110 parallels the existing Pahrump-Mead Transmission Line.

Alternatives A through F all cross the same amount of Desert Tortoise Translocation Area (26,400 linear feet). Alternatives G through L would parallel SR 161 and I-15 and avoid crossing the translocation area. All 12 alternatives cross approximately the same amount of BLM grazing allotment (51,800 to 55,400 linear feet), and Jean/Roach Dry Lakes Special Recreation Management Area (36,000 to 38,400 linear feet). Approximately 140,000 (Alternative A) to 168,500 (Alternative J) linear feet of public lands would be crossed by the 12 alternatives. Highway and railroad crossings, transmission line crossings, and drainage (as designated on USGS topographic maps) are similar among the 12 alternatives. Those alternatives that cross the McCullough Range through the south pass (Alternatives A, B, F, G, H, and L) are in Bighorn Sheep Winter Range; Alternatives C, D, E, I, J, and K cross the McCullough Range through the northern pass and are in an area that is designated as critical winter habitat.

Lands within Eldorado Valley are under the jurisdiction of the City of Boulder City which has designated specific areas for recreation, conservation, and open space use. Linear distances crossed by the 12 alternatives range widely, depending on segment composition. Alternatives B, C, H, and I cross less recreational use land (6,860 linear feet) than would be crossed by the other alternatives. Alternatives A, D, G, and J each cross less conservation use land (26,300 linear feet) than the other alternatives. Alternatives A, D, G, and J would not cross lands that are designated as open space.

Table 3-10 summarizes transmission line lengths and features associated with each of the 12 transmission line alternatives.

Table 3-10 Transmission Line Alternatives

Alternatives	A	B	C	D	E	F	G	H	I	J	K	L
Segments	10, 30, 50, 70, 100, 130, 140	10, 30, 50, 70, 80, 90, 120, 140	10, 30, 50, 60,90, 120, 140	10, 30, 50, 60 80, 100, 130, 140	10, 30, 50, 60, 90, 110, 130, 140	10, 30, 50, 70, 80, 90, 110, 130, 140	40, 50, 70, 100, 130, 140	40, 50, 70, 80, 90 120, 140	40, 50, 60, 90, 120, 140	40, 50, 60, 80, 100, 130, 140	40, 50,60, 90,110, 130, 140	40, 50, 70, 80, 90, 110, 130, 140
Length (ft)	244,760	250,360	252,260	249,460	250,660	248,760	268,700	274,300	276,200	273,400	274,600	272,700
Length (mi)	46.4	47.4	47.8	47.2	47.5	47.1	50.9	52.0	52.3	51.8	52.0	51.6
Parallel to Linear Feature (ft)	237,700	241,900	245,700	241,500	244,100	240,300	268,200	272,400	276,200	272,000	274,600	270,800
Non-parallel to Linear Feature (ft)	7,060	8,460	6,560	7,960	6,560	8,460	500	1,900	0	1,400	0	1,900
Within BLM Utility Corridor (ft)	237,700	241,900	245,700	241,500	228,300	224,500	209,800	214,000	217,800	213,600	200,400	196,600
Not Within BLM Utility Corridor (ft)	7,060	8,460	6,560	7,960	22,360	24,260	58,900	60,300	58,400	59,800	74,200	76,100
Valley Floor Habitat (ft)	206,960	212,560	208,860	206,060	207,260	210,960	230,900	236,500	232,800	230,000	231,200	234,900
Mountain Habitat (ft)	37,800	37,800	43,400	43,400	43,400	37,800	37,800	37,800	43,400	43,400	43,400	37,800
Desert Tortoise Translocation (ft)	26,400	26,400	26,400	26,400	26,400	26,400	0	0	0	0	0	0
Desert Tortoise Cat. B Habitat (ft)	51,460	51,460	51,460	51,460	51,460	51,460	81,960	81,960	81,960	81,960	81,960	81,960
Desert Tortoise Crucial Habitat (ft)	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000
Crucial Quail Habitat (ft)	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000
BLM Grazing Allotment (ft)	51,800	51,800	55,400	55,400	55,400	51,800	51,800	51,800	55,400	55,400	55,400	51,800
Special Use Areas (recreation) (ft)	66,900	66,900	69,300	69,300	69,300	66,900	97,900	97,900	100,300	100,300	100,300	97,900
Roach/Jean Lake Special Use Area (ft)	36,000	36,000	38,400	38,400	38,400	36,000	36,000	36,000	38,400	38,400	38,400	36,000
Public Lands Crossed (ft)	140,060	141,460	143,360	144,760	143,360	141,460	163,800	165,200	167,100	168,500	167,100	165,200
Private Lands Crossed (ft)	103,700	107,900	107,900	103,700	106,300	106,300	103,700	107,900	107,900	103,700	106,300	106,300
Transportation Corridor Crossed (ft)	1,500	1,500	1,500	1,500	1,500	1,500	1,200	1,200	1,200	1,200	1,200	1,200
Highway & Rail Crossings	5	5	5	5	5	5	6	6	6	6	6	6
Utility Line Crossings	11	17	9	11	13	21	11	17	9	11	13	21
Drainage Crossings*	35	36	36	37	34	34	40	41	41	42	39	39
Bighorn Sheep Winter Range (ft)	12,500	12,500	0	0	0	12,500	12,500	12,500	0	0	0	12,500
Bighorn Sheep Winter/Critical (ft)	0	0	14,200	14,200	14,200	0	0	0	14,200	14,200	14,200	0
Major PI Structures (estimated)	17	22	21	18	20	21	18	23	22	19	21	22

Alternatives	A	B	C	D	E	F	G	H	I	J	K	L
Eldorado Recreation Area (ft)	15,400	6,860	6,860	15,400	20,400	20,400	15,400	6,860	6,860	15,400	20,400	20,400
Eldorado Conservation Area (ft)	26,300	36,400	36,400	26,300	62,700	62,700	26,300	36,400	36,400	26,300	62,700	62,700
Eldorado Open Space (ft)	0	39,640	39,640	0	10,800	10,800	0	39,640	39,640	0	10,800	10,800
Vegetation Communities Crossed												
Creosote - White Bursage (ft)	166,900	130,200	122,600	162,100	153,100	160,700	207,400	170,700	163,100	202,600	193,600	201,200
Mixed Scrub/Succulent (ft)	49,360	49,360	58,860	58,860	58,860	49,360	32,800	32,800	42,300	42,300	42,300	32,800
Blackbush (ft)	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Desert Saltbush (ft)	10,000	34,800	34,800	10,000	20,200	20,200	10,000	34,800	34,800	10,000	20,200	20,200
Stabilized Dune (ft)	13,500	30,500	30,500	13,500	13,500	13,500	13,500	30,500	30,500	13,500	13,500	13,500
Saltcedar (ft)	0	500	500	0	0	0	0	500	500	0	0	0

*Drainage Crossings as determined from USGS quads

Note: Total lengths include 6,560 ft interconnection to VEA corridor.

Although Alternatives G through L would parallel existing linear features and avoid crossing the Desert Tortoise Translocation Area, they were eliminated from further consideration because they would potentially conflict with future development along SR 161 and because they would cross BLM-designated disposal lands around Jean. Corridor segments west of I-15 are not within BLM established utility corridors.

Elimination of these six alternatives also was based on adverse visual impacts from SR 161 and I-15, which would be ameliorated by selection of alternatives that cross the valley to the south (Alternatives A through F) within a designated utility corridor that is currently used by the Pahrump-Mead Transmission Line and the new Bighorn-Arden Transmission Line. Alternatives G through L also were found to be 5 to 15 percent longer than those associated with Alternatives A through F.

Alternatives A through F were retained for further evaluation and comparison. Alternatives A through F follow the same corridor from the plant site to the vicinity of Hidden Valley. Alternatives A, B, and F cross through McCullough Pass along Segment 70 and proceed either along a northern alignment that parallels the VEA Pahrump-Mead Transmission Line corridor to Mead Substation or along a southern alignment that would pass near Marketplace and Eldorado substations before continuing to the northeast and terminating at Mead Substation. Alternatives C, D, and E would parallel the VEA Pahrump-Mead Transmission Line through Hidden Valley and cross the McCullough Range through a pass that is approximately one to two miles north of McCullough Pass. East of the McCullough Range, the corridors would either parallel the VEA Pahrump-Mead Transmission Line to Mead Substation or pass near the Marketplace and Eldorado substations before continuing to the northeast and terminating at Mead Substation.

Alternatives A and D each use Segment 100 which closely parallels existing transmission lines from McCullough Pass to Marketplace Substation. Segment 100 was ultimately eliminated from further consideration due to limitations in space near Marketplace Substation which resulted in the elimination of Alternatives A and D from further consideration.

A constructability review, conducted during May 2002 resulted in the elimination of Segment 70 as a viable option. Construction of the Segment 70 through the McCullough Range would require several line crossings near the top of McCullough Pass and construction over extremely rugged terrain north of the pass. The elimination of Segment 70 as a viable option also resulted in the elimination of Segment 80, east of the McCullough Range and the elimination of Alternatives B and F from further consideration.

Features crossed by the two remaining alternatives (Alternatives C and E) that were retained for further consideration are identified in Table 3-11. The two alternatives are shown on Figure 3-9.

Table 3-11 Resources Crossed by Retained Transmission Line Alternatives

	Alternatives	
	C	E
Segments	**10, 20, 30, 50, 60, 90, 120, 140**	**10, 20, 30, 50, 60, 90, 110, 130, 140**
Length (ft)	252,260*	250,660*
Length (mi)	47.8	47.5
Parallel to Linear Feature	245,700	244,100
Non-parallel to Linear Feature	6,560	6,560
Within BLM Utility Corridor	245,700	228,300
Not Within BLM Utility Corridor	6,560	22,360
Valley Floor Habitat	208,860	207,260
Mountain Habitat	43,400	43,400
Desert Tortoise Translocation	26,400	26,400
Desert Tortoise Cat. B (ft)	51,460	51,460
Desert Tortoise Crucial Habitat (ft)	21,000	21,000
Crucial Quail Habitat (ft)	13,000	13,000
BLM Grazing Allotment	55,400	55,400
Special Use Areas (recreation)	69,300	69,300
Roach/Jean Lake Special Use Area	38,400	38,400
Public Lands Crossed	143,360	143,360
Private Lands Crossed	107,900	106,300
Transportation Corridor Crossed	1,500	1,500
Highway & Rail Crossings	5	5
Utility Line Crossings (estimated)	9	13
Drainage Crossings**	36	34
Bighorn Sheep Winter Range	0	0
Bighorn Sheep Winter/Critical	14,200	14,200
Major PI Structures (estimated)	21	20
Eldorado Recreation Area	6,860	20,400
Eldorado Conservation Area	36,400	62,700
Eldorado Open Space	39,640	10,800

*Includes interconnecting circuits to VEA Pahrump-Mead Transmission Line corridor.
**Drainage Crossings as determined from USGS quads

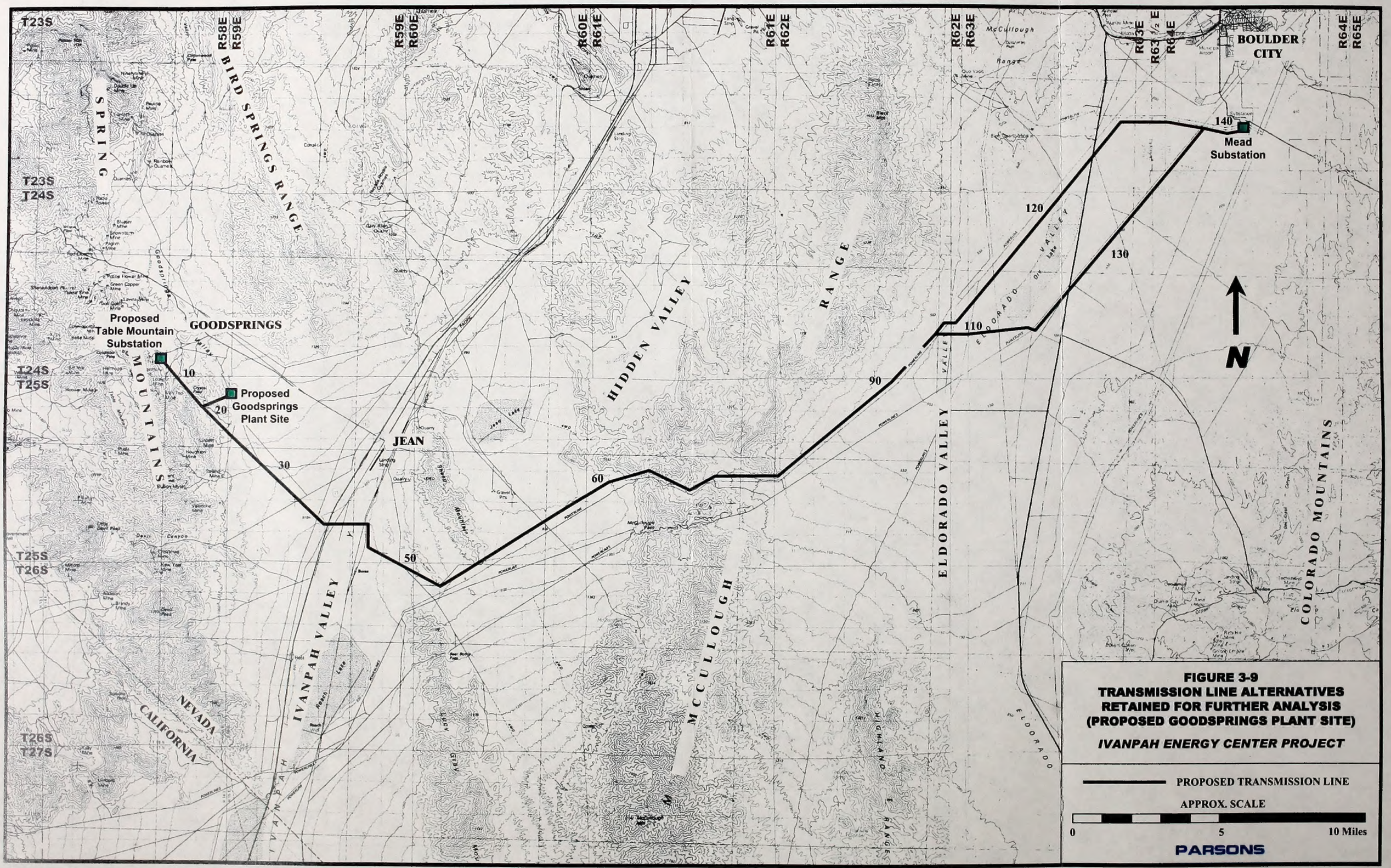


FIGURE 3-9
TRANSMISSION LINE ALTERNATIVES RETAINED FOR FURTHER ANALYSIS (PROPOSED GOODSPRINGS PLANT SITE)

IVANPAH ENERGY CENTER PROJECT

PROPOSED TRANSMISSION LINE

APPROX. SCALE

0 5 10 Miles

PARSONS



Alternatives C and E are similar in length and nearly all resources crossed. Although both routes would be within BLM-designated Utility Corridors to the extent practicable, Alternative C would deviate less from designated utility corridors. Areas that would not be within designated utility corridors include Segment 110 (15,800 linear feet) and circuits from the IEC Substation to the VEA Pahrump-Mead Transmission Line corridor.

The two alternatives also differ in lands crossed that are designated by the City of Boulder City for recreation and conservation use and as open space. Alternative E would cross more recreation and conservation use land than would be crossed by Alternative C. Alternative C would cross more designated open space land than would be crossed by Alternative E.

The following summarizes components of Alternatives C and E.

Alternative C

Alternative C would cross through the Ivanpah Valley parallel to the existing VEA Pahrump-Mead 230 kV Transmission Line and pass through the McCullough Range, north of McCullough Pass (Segment 60). East of the McCullough Range, the line would parallel the VEA transmission line to Eldorado Dry Lake where the existing VEA Pahrump-Mead turns to the east (Segment 110). Alternative C would continue to the northwest, west of Eldorado Dry Lake (Segment 120) and join Segment 140 where it continues to the east to Mead Substation. Although single circuit structures would be used throughout most of the route, topographic constraints through the McCullough Range (Segment 60) would require installation of several double-circuit structures to accommodate the existing VEA line and the new line. Several H-frame structures would be required to cross under existing transmission lines in the Eldorado Valley. Lines that would require crossing include:

- Los Angeles Department of Water and Power Intermountain–Adelanto 500 kV DC Transmission Line
- Nevada Power Company Decatur – McCullough 230 kV Transmission Line
- Nevada Power Company Mead – McCullough 230 kV Transmission Line (# 1)
- Nevada Power Company Mead – McCullough 230 kV Transmission Line (# 2)
- Los Angeles Department of Water and Power Mead – Navajo 500 kV Transmission Line
- Southern California Edison Boulder – Chino 230 kV Transmission Line
- Southern California Edison 230 kV Transmission Line
- Valley Electric Association Pahrump – Mead 230 kV Transmission Line
- Salt River Project Mead – Phoenix 500 kV Transmission Line
- Los Angeles Department of Water and Power Mead – McCullough 500 kV Transmission Line (# 1)
- Los Angeles Department of Water and Power Mead – McCullough 500 kV Transmission Line (# 2)

- Los Angeles Department of Water and Power Mead – Victorville Transmission Line

The alternative would utilize Segments 10, 20, 30, 50, 60, 90, 120, and 140 and total 252,260 linear feet (47.8 miles).

Alternative E

Alternative E would cross the McCullough Range north of McCullough Pass (Segment 60) and continue in a northeasterly direction along Segment 90 parallel to the existing VEA Pahrump-Mead Transmission Line, as described in Alternative C. East of the pass, the alternative would parallel the northwest side of the existing VEA Transmission Line along Segments 90 and 110. Seven existing transmission lines would be crossed near the western margin of Eldorado Valley and five transmission lines (including the existing VEA Pahrump-Mead Transmission Line) would be crossed near the eastern margin, as identified in Alternative C. The route would then parallel the east side of the five lines, east of Eldorado Dry Lake (Segment 130) and enter Mead Substation along Segment 140.

Alternative E would use Segments 10, 20, 30, 50, 60, 90, 110, 130, and 140 and would total 250,660 feet (47.5 miles).

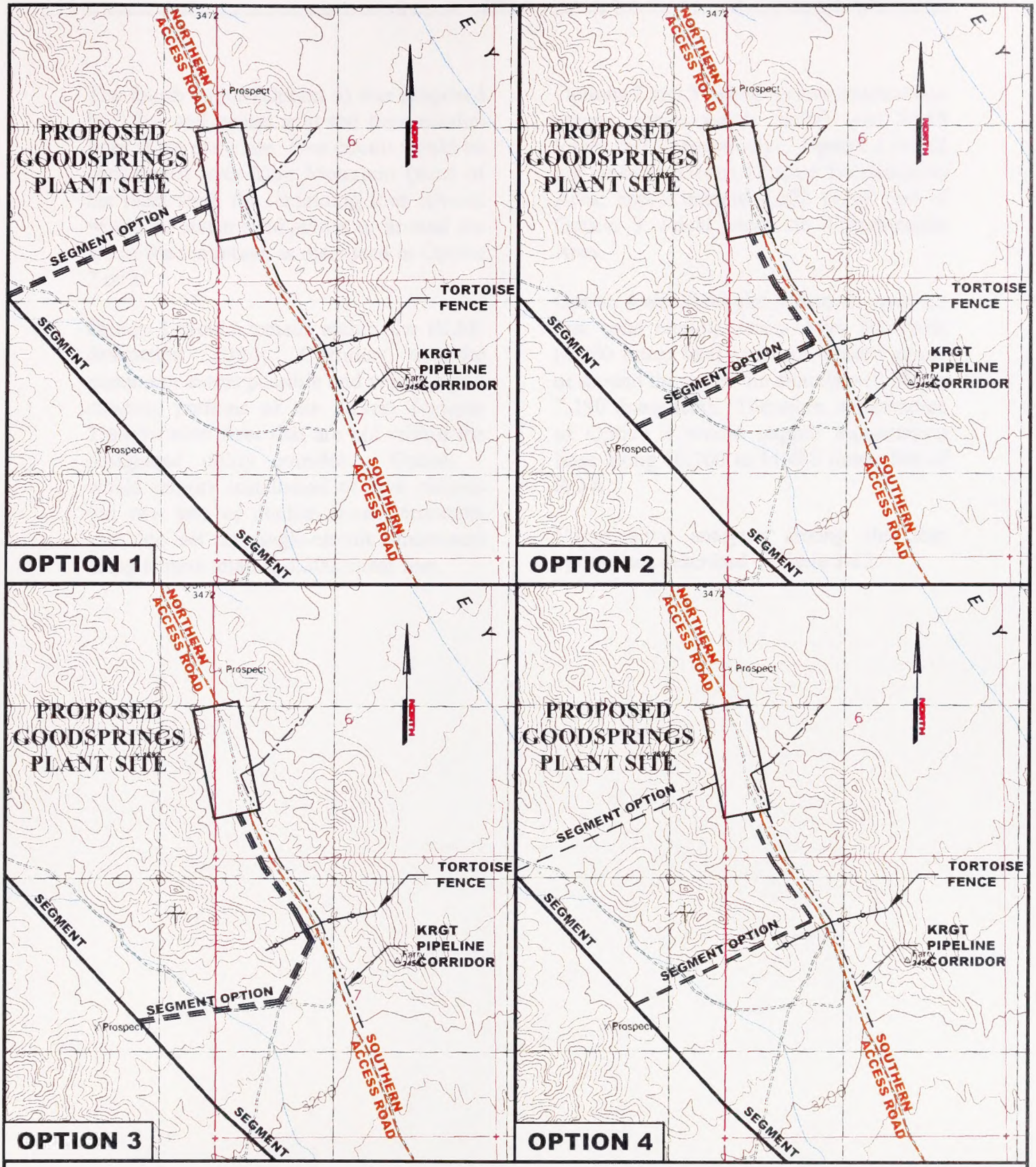
Plant Site Access Options

Five circuits would interconnect the Ivanpah Energy Center to the existing VEA Pahrump-Mead Transmission Line, the Table Mountain Substation, and Mead Substation. A double-circuit line would extend from the energy center to Table Mountain Substation (Ivanpah-Table Mountain #1 and #2). Two circuits would tap the existing Pahrump-Mead Trans-mission Line to the Ivanpah Substation – the northern portion of the existing line would be renamed the Pahrump-Ivanpah Transmission Line; the southern portion of the line would become the Ivanpah-Mead #1. The new transmission line from the plant to the Mead Substation would be identified as the Ivanpah-Mead #2. Interconnections of the lines are shown on Figure 3-8.

Can transmission lines to Table Mountain substation share the same structure?

Four site access options (routes) were considered for construction of the five transmission line interconnection circuits between the existing VEA Pahrump-Mead Transmission Line corridor, the Table Mountain double-circuit line, and the Ivanpah-Mead (#2) Transmission Line (Figure 3-10). These options are along the three segments that parallel the previously discussed water supply pipeline route; the fourth option would split the lines.

Option 1 was originally proposed by VEA and would parallel the proposed transmission line to the point of interconnection and then turn to the east and cross rugged terrain, over a mountain (Mira Mountain) to the plant site. Options 2 and 3 were identified during the EIS process. Option 2 would remain within lowlands, across the southern toe of the mountain (north of the existing Desert Tortoise Fence), and continue to the north, paralleling the west side of County Road 53Y and KRGT pipeline corridor to the plant site. Option 3 would depart from the BLM-designated Utility Corridor near that of Option 2 and parallel an undesignated gravel road around the toe of the mountain. The alignment would then parallel the west side of County Road 53Y and the KRGT pipeline corridor to the plant site along the same alignment as that of Option 2.



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FIGURE 3-10
TRANSMISSION LINE PLANT ACCESS ALTERNATIVES
(PROPOSED GOODSPRINGS PLANT SITE)

The fourth option (Option 4) was proposed by VEA and would split the transmission lines at the plant site. One circuit would be constructed over Mira Mountain (west of the plant site); the remaining four circuits would be constructed across or around the toe of the mountain, as discussed in Option 2 or 3.

Option 1 would remain within the BLM-designated Utility Corridor to the maximum extent possible and would avoid crossing portions of the Desert Tortoise Translocation Area that are not within the designated utility corridor. Option 1 would require installation of five circuits (on two sets of double-circuit structures and one set of single-circuit structures) along a route totaling 4,200 linear feet.

Options 2 and 3 would require construction across approximately 6,560 and 7,280 linear feet (respectively). Option 2 would not cross the Desert Tortoise Translocation Area; approximately 4,225 linear feet of Option 3 would cross the Translocation Area.

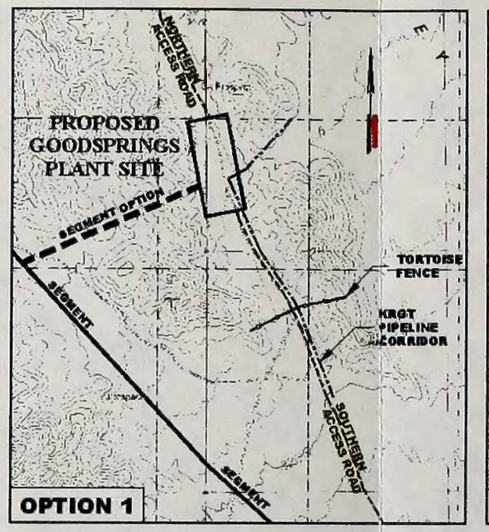
Option 4 would require construction of one line (one circuit) across Mira Mountain (4,200 linear feet) and four circuits across or around the toe of the mountain (6,560 or 7,280 linear feet). Therefore, construction of Option 4 would require transmission lines along 10,760 to 11,480 linear feet of ROW.

Comparative analyses among the four options are described in Table 3-12.

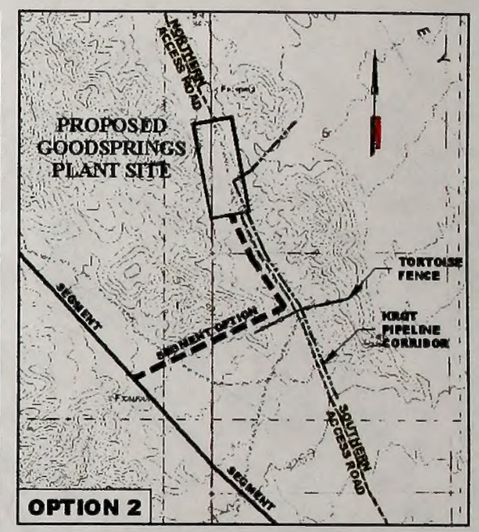
Table 3-12 Plant Site Access Options -- Transmission Line

	Option 1 Across the Mountain West of the Plant Site	Option 2 Across the Toe of the Mountain West of the Plant Site and North of Desert Tortoise Fence	Option 3 Around the Toe of the Mountain West of the Plant Site and Parallel to an Existing Gravel Road	Option 4 One Circuit Across the Mountain West of the Plant Site plus Four Circuits Around Toe of the Mountain (along Option 2)
Total Length IEC Substation to VEA Corridor	4,200 linear feet	6,560 linear feet	7,280 linear feet	10,760 linear feet.
IEC Substation to Table Mountain Substation corridor and circuit lengths	Shortest distance of the four options	Shorter than Option 3, longer than Options 1 or 4	Longest of the Options	Longer than Option 1, shorter than Options 2 or 3.
Acres Permanently Disturbed.	-0-	- 0 -	-0-	1.4 acres
Acres Temporarily Disturbed[1]	Less than Option 4	7.1 acres	More than Option 2	3.5 acres
Transmission Line Corridor Length through Desert Tortoise Translocation Area (feet)[2]	0.0 linear feet	0.0 linear feet	4,225 linear feet	0.0 linear feet.
Construction Factors	Construction of five circuits on steep slopes	Construction on relatively flat terrain		One circuit would be constructed on steep slopes; four circuits would be constructed on relatively flat terrain.
Ecological Factors	Not within the Desert Tortoise Translocation Area[3]	Not within the Desert Tortoise Translocation Area[3]	Approximately 4,225 linear feet within the Desert Tortoise Translocation Area[4]	May or may not be within Desert Tortoise Translocation Area (depending on the option around the toe of the mountain).
Visual Impacts	Permanent visual impacts that are not associated with Options 2 or 3.	Minimally visible to the general public because the lines would be mostly screened from views from SR 161 and because views from I-15 would be a considerable distance.		Permanent visual impacts that are not associated with Options 2 or 3. However, the level of visual impacts would be less than that of Option 1.
Restoration/Remediation	Difficult and may not be entirely effective due to steep slopes	Restoration would be on relatively level ground. Difficulties associated with restoration are not anticipated.		Restoration along the line across the mountain may not be entirely effective due steep terrain. However, restoration would be less difficult than that required for Option 1.
Other Factors	Construction and maintenance costs would be greater than those of Options 2 and 3. High erosion potential on steep slopes. Potentially greater vulnerability to lightning strikes, high winds, and structure base instability	Construction requirements (and related costs) would be less than that of Option 1. Low erosion potential. Less vulnerability to lightning strikes, high winds, and structure base instability than circuits that would cross the mountain (Options 1 or 4). Option 2 would cost less than Option 3.		Construction requirements (and related costs) would be about $300,000 less than that of Option 2. Potentially greater vulnerability to lightning strikes, high winds, and structure base instability associated with the one circuit that would cross the mountain. Other circuits around the toe of the mountain would be less susceptible to such occurrences.

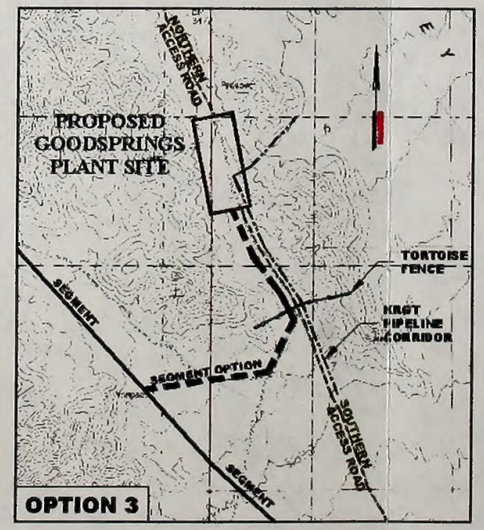
(1) Estimated based on new and/or improved 18-foot-wide road requirement for construction.
(2) Estimate does not include area within BLM-designated Utility Corridor
(3) North of Desert Tortoise Translocation fence
(4) South of Desert Tortoise Translocation fence



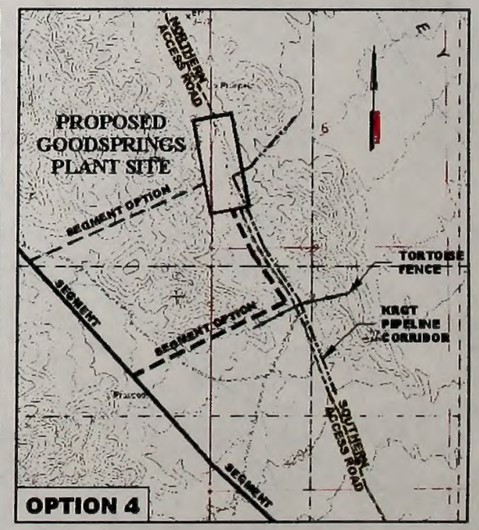
1 Five Circuits Across Mountain



2 Five Circuits Across Toe of Mountain, but North of Translocation Area



3. Five Circuits Across Toe of Mountain, but South of Translocation Area.



4. One Circuit Over Mountain; Four Circuits Across Toe of the Mountain.

3.4.2 Primm Plant Site Alternative

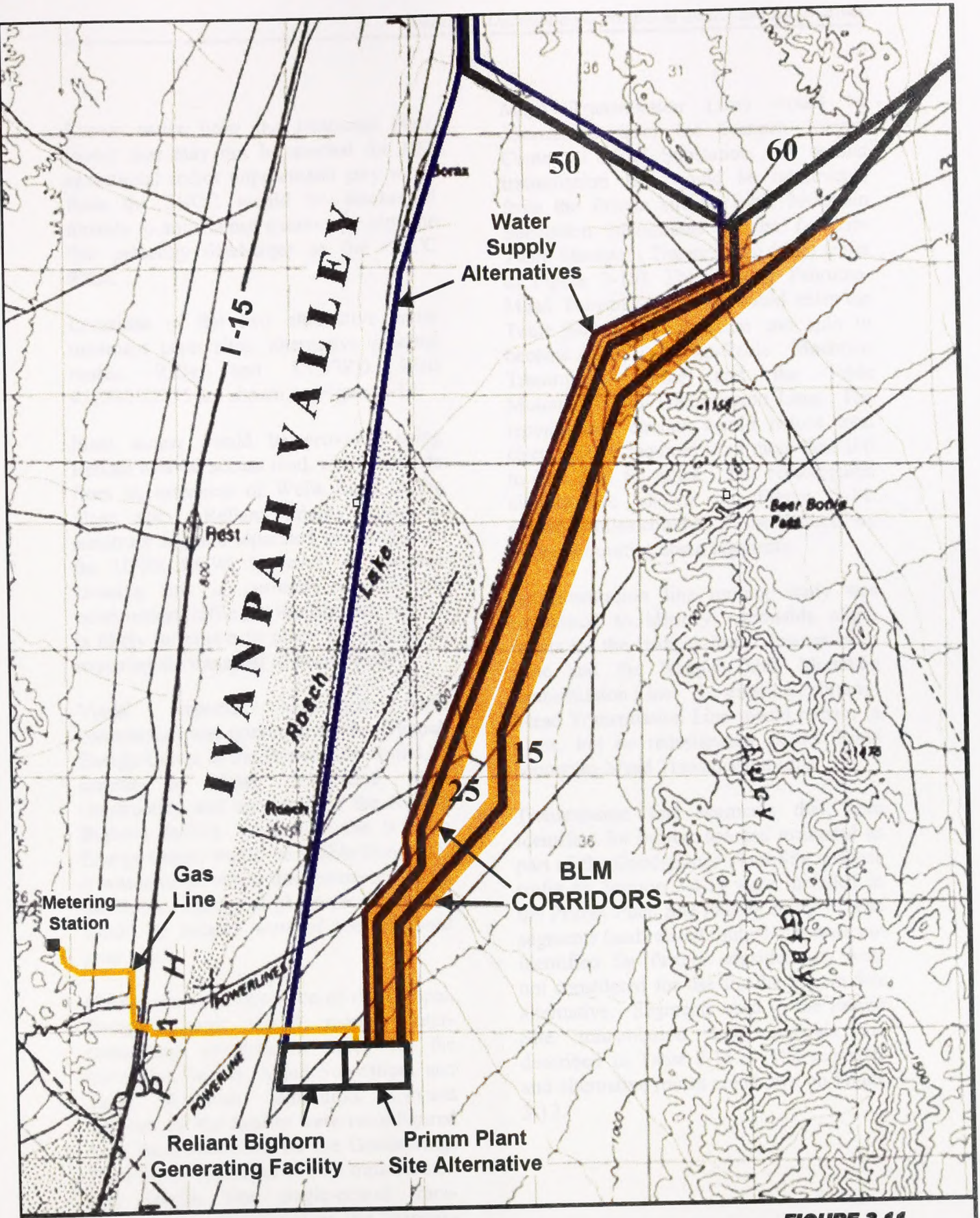
The Primm Plant Site Alternative was identified as a potential location for the Ivanpah Energy Center. If constructed on private land at the Primm site, the facility would be co-located on a 166-acre parcel that is currently under lease by Reliant Energy for the Reliant Bighorn Generating Facility. Reliant Energy received authorization to construct their 500 MW combined-cycle gas-fired power plant, a 38-mile-long double-circuit transmission line, a 3.2-mile-long natural gas supply pipeline, and related facilities components from Clark County and the BLM during the fall of 2001. Approximately 85 acres of the 166-acre parcel were rezoned for heavy industrial use (M-2), at the request of Reliant Energy. When operational, the Bighorn facility will occupy approximately 40 acres of the western portion of the 166-acre parcel; approximately 45 acres of M-2 zoned industrial land would be available for development. The Bighorn facility is currently under construction and is expected to be operational during the fall of 2003. The plant site area is shown on Figure 3-11.

If constructed on the portion of land that is leased by Reliant Energy that has been rezoned as M-2, additional lands may need to be re-zoned to accommodate the Ivanpah Energy Center that would require approximately 30 permanent acres and 10 temporary laydown area acres. The original 166-acre parcel is approximately one mile east of Primm, Nevada and east of the UPRR. The Ivanpah Energy Center would be configured in a manner that would be similar to that described for the Goodsprings site.

Construction of the Ivanpah Energy Center at the Primm Site (Plant Site Alternative F) would require construction of a natural gas pipeline that would parallel a similar natural gas pipeline that will be installed by the Kern River Gas Transmission Company (KRGT) for the Reliant Bighorn facility. The 3.2-mile-long natural gas pipeline would connect to the KRGT, west of I-15. A 100 by 200-foot (0.46 acre) metering station also would be required at the KRGT pipeline. The metering station would be located adjacent to a similar metering station that will be constructed for the Bighorn project.

Process water for the Ivanpah Energy Center at Primm would be provided through a pipeline from the previously described water treatment facility that would be located on State of Nevada land that is near the SNCC. Well #52732/52735 (proposed for use by the project proponent), located near the SNCC, would provide supplemental water, should gray water flows from the SNCC become insufficient to meet plant needs. Use of the SNCC water and the availability of supplemental water from Well #52732/52735 would ensure ample water availability for plant use.

Use of one of two 0.7-acre parcels north of Prison Road would require construction of a 10.9-mile-long water supply pipeline along the east side of the UPRR ROW to the Primm Plant Site or construction along the east side of the UPRR to, and co-located within the proposed Ivanpah-Table Mountain Transmission Line corridor to the Primm site, a total distance of 13.6 miles.



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FIGURE 3-11
PRIMM PLANT SITE ALTERNATIVE AREA

Excess water from the treatment plant (water that may not be needed for IEC operations) and/or unprocessed gray water from the SNCC would be discharged directly to an existing wastewater pipeline that presently discharges to the SNCC RIBs.

Locations of the two alternative water treatment plant sites, alternative pipeline routes, RIBs, and LVVWD Well #52732/52735 are shown on Figure 3-12.

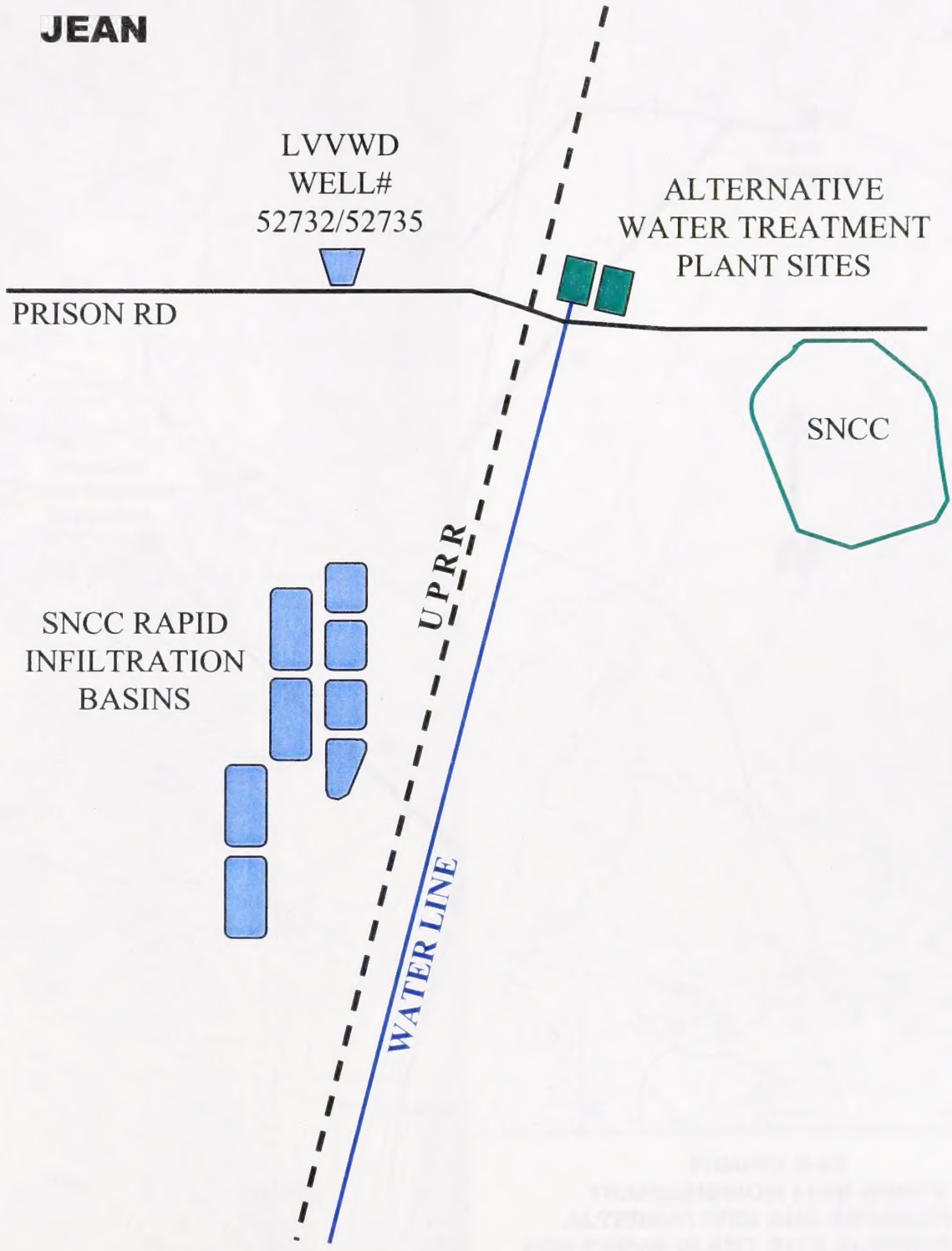
Plant access would be provided using Reliant's paved access road, which extends from an extension of Wells Road to the plant site. Reliant Energy plans to construct a grade-separated crossing over the UPRR ROW; however, an at-grade crossing that is currently in use for construction traffic for the Bighorn facility is likely to remain in place for future use requiring the transport of heavy loads.

Visual impacts associated with construction and operation of the Ivanpah Energy Center at the Primm Site would be similar to those associated with construction and operation of the Reliant Bighorn facility. Although the Ivanpah Energy Center would be visible from I-15, it would be screened from many views by the Reliant Energy Bighorn facility which would be located west of the proposed plant site.

Construction and operation of the Ivanpah Energy Center would require interconnecting transmission lines to the generating facility, Mead Substation, and Table Mountain Substation. Circuits required for the facility were reconfigured from those described for the Goodsprings Plant Site to minimize overall transmission line lengths. One single-circuit transmission line (designated as the Ivanpah-Mead Transmission Line) would be constructed from the Ivanpah Energy Center to Mead Substation. A second transmission line would be constructed from the Primm site to Table Mountain Substation (designated as the Ivanpah-Table Mountain Transmission Line) (refer to Figure 3-13). The existing Pahrump-Mead Transmission Line would enter the Table Mountain Substation and split to become the Pahrump-Table Mountain Transmission Line and the Table Mountain-Mead Transmission Line. The reconfigured circuits would reduce total circuit length required from more than 100 to less than 60 miles. The reconfigured circuits are shown on Figure 3-14. Corridor miles could be further reduced by double-circuiting some segments.

A transmission line routing study was performed to identify reasonable alignments for the Ivanpah-Mead Transmission Line and the Ivanpah-Table Mountain Transmission Line. The existing Pahrump-Mead Transmission Line would remain in place, but be redesignated as the Table Mountain-Mead Transmission Line.

Transmission line segments that were identified for project use and evaluated as part of the Goodsprings Plant Site analysis (refer to Section 3.4.1) were included in the Primm Plant Site routing study. Those segments (and related routes) that were not identified for further consideration were not considered for use for the Primm Site alternative. Segments used in the Primm Site transmission line analysis are described in Table 3-13. The segments and alternative routes are shown on Figure 3-13.



Sketch Not Drawn To Scale

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FIGURE 3-12
ALTERNATIVE WATER TREATMENT PLANT SITES
(PRIMM PLANT SITE ALTERNATIVE)

Proposed Table Mountain Substation

Mead Substation

Reliant Bighorn Generating Facility

Primm Plant Site Alternative

JEAN

10

30

50

60

25

15

60/65

90

110

120

130

140

N

NEVADA

CALIFORNIA

SPRING MOUNTAINS

McCULLOUGH RANGE

HIGHLAND RANGE

PROPOSED TRANSMISSION LINE

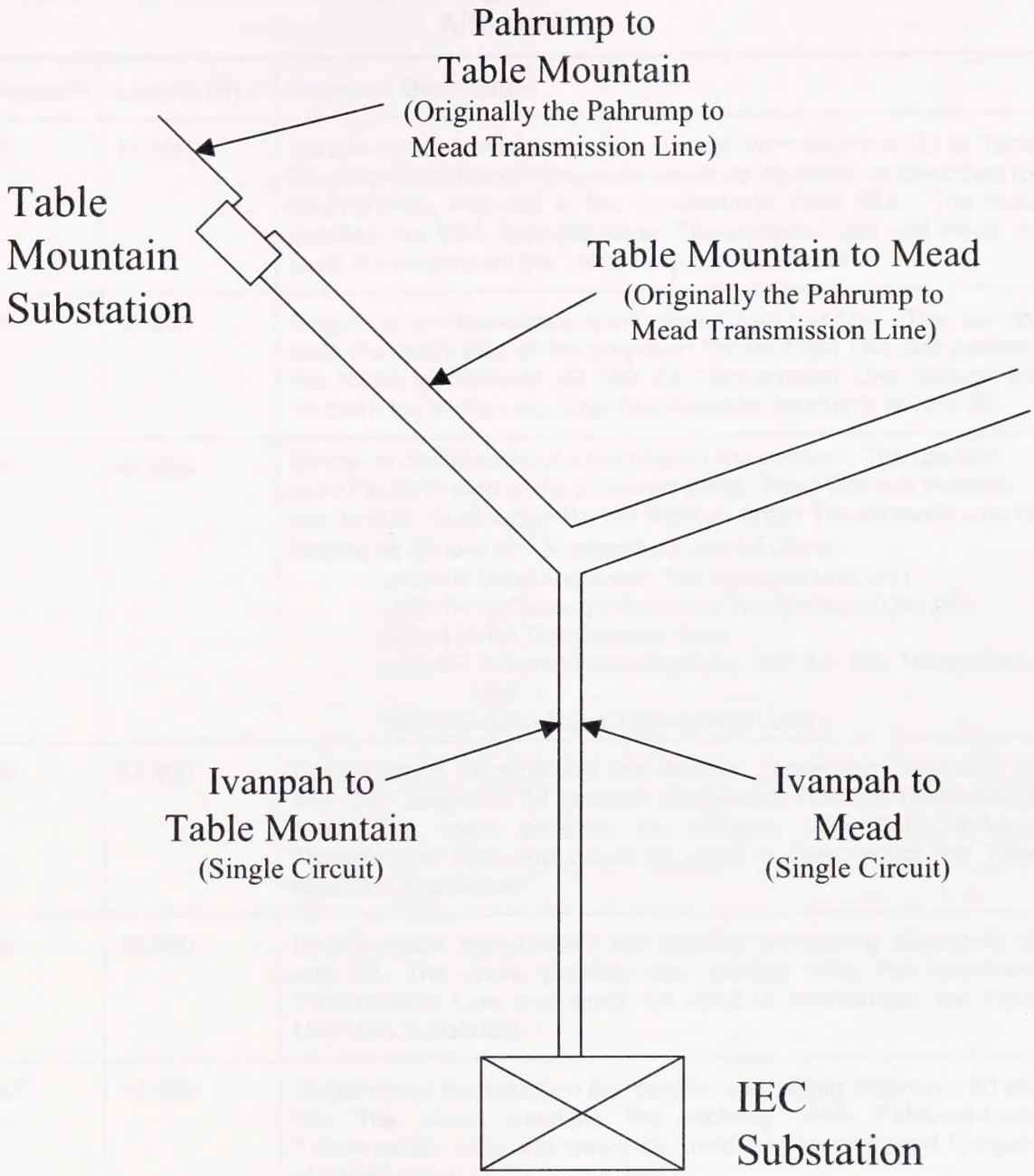
APPROX. SCALE

0 5 10 Miles

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FIGURE 3-13
TRANSMISSION LINE ROUTE ALTERNATIVES AND SEGMENTS FOR PRIMM PLANT SITE ALTERNATIVE

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FIGURE 3-14
SCHEMATIC OF TRANSMISSION LINES FROM PRIMM PLANT SITE ALTERNATIVE TO TABLE MOUNTAIN SUBSTATION

Table 3-13 Transmission Line Segment Description – Primm Plant Site Alternative

Segment	Length (ft)	Segment Description
10	17,000	Double-circuit transmission line corridor from Segment 30 to Table Mountain Substation. The route would be the same as described for Segment 10, included in the Goodsprings Plant Site. The route parallels the VEA Pahrump-Mead Transmission Line and would be used to interconnect the Table Mountain Substation.
15	53,000	Single- or multiple-circuit transmission line corridor. The corridor exits the north side of the proposed Primm Plant Site and parallels the Mead to Adelanto #2 500 kV Transmission Line through the northern toe of the Lucy Gray Mountains to Segments 60 and 65.
25	41,800	Single- or multiple-circuit transmission line corridor. The corridor exits the north side of the proposed Primm Plant Site and parallels the recently constructed Reliant Bighorn-Arden Transmission Line to Segments 50 and 60. Segment 25 would cross: LADWP Mead-Victorville Transmission Line (#1) LADWP McCullough-Victorville Transmission Line (#2) SCE 115 kV Transmission Line LADWP Intermountain-Adelento 500 kV DC Transmission Line VEA Pahrump-Mead Transmission Line
30	27,900	Double-circuit transmission line corridor connecting Segments 10 and 50. Segment 30 crosses the Desert Tortoise Translocation Area. The route parallels the existing VEA Pahrump-Mead Transmission Line and would be used to interconnect the Table Mountain Substation.
50	25,900	Double-circuit transmission line corridor connecting Segments 30 and 60. The route parallels the existing VEA Pahrump-Mead Transmission Line and would be used to interconnect the Table Mountain Substation.
60[1]	14,400	Single-circuit transmission line corridor connecting Segments 50 and 65. The route parallels the existing VEA Pahrump-Mead Transmission Line and would be used for the proposed Ivanpah-Mead #2 circuit.
65[1]	52,300	Single-circuit transmission line corridor connecting Segments 60 and 90. The route parallels the existing VEA Pahrump-Mead Transmission Line and would be used for the proposed Ivanpah-Mead #2 circuit.

Segment	Length (ft)	Segment Description
90	36,400	Single-circuit transmission line corridor connecting Segments 65 and 110. The route parallels the existing VEA Pahrump-Mead Transmission Line and would be used for the proposed Ivanpah-Mead #2 circuit.
110[(2)]	15,800	Single-circuit transmission line corridor connecting Segments 90 and 130. The route parallels the existing VEA Pahrump-Mead Transmission Line and would be used for the proposed Ivanpah-Mead #2 circuit.
120[(2)]	61,300	Single-circuit transmission line corridor connecting Segments 90 and 140. The route parallels existing transmission lines northwest of Eldorado Dry Lake and would be used for the proposed Ivanpah-Mead #2 circuit.
130	43,900	Single-circuit transmission line corridor connecting Segments 110 and 140. The route parallels existing transmission lines southeast of Eldorado Dry Lake and would be used for the proposed Ivanpah-Mead #2 circuit.
140	10,500	Single-circuit transmission line corridor connecting Segments 120 or 130 to Mead Substation. The route parallels the same corridor that is used by the existing VEA Pahrump-Mead Transmission Line and would be used for the proposed Ivanpah-Mead #2 circuit.

[(1)] Segments 60 and 65 were originally combined as Segment 60 for the Goodsprings Site analysis. The original segment was split to accommodate the addition of Segment 15 for the Primm Site analysis.

[(2)] Refer to Table 3-13 for line crossing information.

Four potential transmission line routes (Designated as Alternatives A, B, C, and D) were selected as reasonable alternatives for construction of the single-circuit Ivanpah-Mead Transmission Line. The alternative routes are comprised of the following transmission line segments:

Alternative A – Segments 15, 65, 90, 120, 140

Alternative B – Segments 15, 65, 90, 110, 130, 140

Alternative C – Segments 25, 60, 65, 90, 120, 140

Alternative D – Segments 25, 60, 65, 90, 110, 130, 140

Alternatives A and B would exit the north side of the proposed plant site and parallel the west side of the existing Mead-Adelanto #2 Transmission Line corridor which crosses through the northern toe of the Lucy Gray Mountains (Segment 15). The Ivanpah-Mead Transmission Line would continue to parallel the corridor northeast of the mountains to intersect Segment 60. For analysis purposes, Segment 60 was split at the point of intersection with Segment 15 to form Segments 60 and 65. Alternatives A and B would continue along Segment 65 (originally, Segment 60) through the McCullough Range and join Segment 90. Alternative A would then continue northwest of Eldorado Dry Lake and terminate at Mead Substation; Alternative B would cross the Eldorado Valley along Segment 110 and continue along the southeast margin of Eldorado Dry Lake to Mead Substation.

Alternatives C and D would exit the north side of the proposed plant site and parallel the Southern California Edison 115 kV corridor to Segments 50 and 60. The alternatives would then turn to the northeast along Segments 60, 65, and 90, before splitting to cross northwest of Eldorado Dry Lake (Alternative C) or southeast of Eldorado Dry Lake (Alternative D).

All four alternatives are similar in length, ranging from 40.1 to 41.0 miles. Alternatives A and C are entirely within BLM-designated utility corridors, whereas 15,800 linear feet of Alternatives B and D (largely comprised of Segment 110) is not within a utility corridor. Alternatives B and D cross more recreation use lands and conservation use lands within Eldorado Valley than are crossed by Alternatives A or C. Conversely, Alternatives A and C cross more lands that are designated as open space within Eldorado Valley than are crossed by Alternatives B or D. Features crossed by each of the four Ivanpah-Mead Transmission Line alternatives are listed in Table 3-14 and shown on Figure 3-15.

Table 3-14 Features Crossed – Ivanpah-Mead Transmission Line

Alternatives	A	B	C	D
Segments	15, 65, 90, 120, 140	15, 65, 90, 110, 130	25, 60, 65, 90, 120, 140	25, 60, 65, 90,110,130,140
Length (ft)	213,500	211,900	216,700	215,100
Length (mi)	40.4	40.1	41.0	40.7
Parallel to Linear Feature (ft)	208,500	206,900	211,700	210,100
Non-parallel to Linear Feature (ft)	5,000	5,000	5,000	5,000
Within BLM Utility Corridor (ft)	213,500	196,100	216,700	199,300
Not Within BLM Utility Corridor (ft)	0	15,800	0	15,800
Valley Floor Habitat (ft)	181,100	179,500	190,300	188,700
Mountain Habitat (ft)	32,400	32,400	26,400	26,400
Desert Tortoise Translocation (ft)	0	0	0	0
Desert Tortoise Crucial Habitat (ft)	21,000	21,000	21,000	21,000
Crucial Quail Habitat (ft)	26,000	26,000	26,000	26,000
BLM Grazing Allotment (ft)	91,600	91,600	94,800	94,800
Special Use Areas (recreation)	78,400	78,400	81,600	81,600
Roach/Jean Lake Special Use Area (ft)	55,400	55,400	76,600	76,600
Public Lands Crossed (ft)	105,300	105,300	108,500	108,500
Private Lands Crossed (ft)	107,900	211,900	216,700	215,100
Transportation Corridor Crossed (ft)	300	300	300	300
Highway & Rail Crossings	1	1	1	1
Utility Line Crossings	13	17	13	17
Drainage Crossings*	21	19	26	24
Bighorn Sheep Winter Range	0	0	0	0
Bighorn Sheep Winter/Critical	14,200	14,200	14,200	14,200

Alternatives	A	B	C	D
Major PI Structures (estimated)	19	18	17	16
Eldorado Recreation Area (ft)	6,860	20,400	6,860	20,400
Eldorado Conservation Area (ft)	36,400	62,700	36,400	62,700
Eldorado Open Space (ft)	39,640	10,800	39,640	10,800
*Drainage crossings as determined from USGS Quads.				

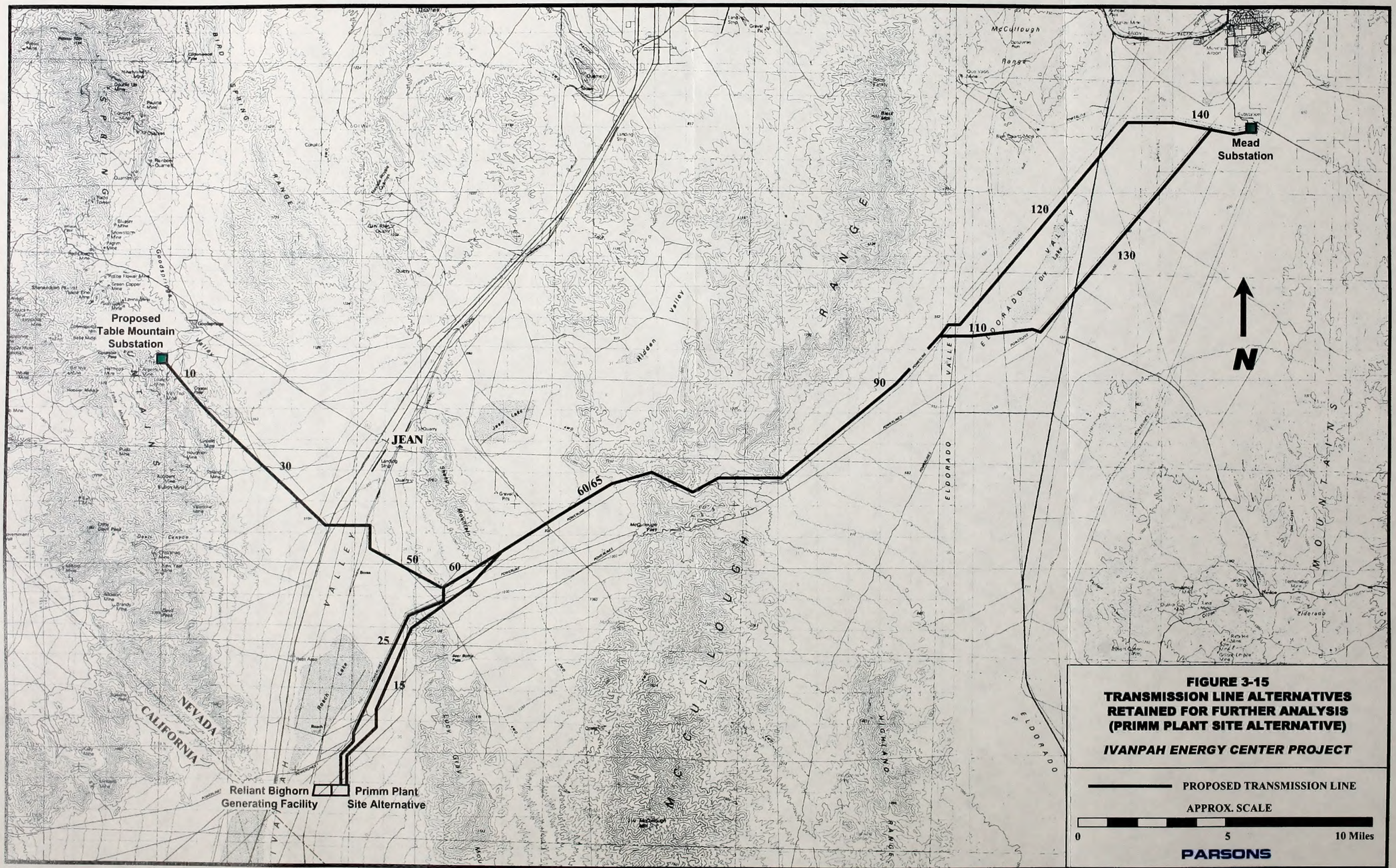


FIGURE 3-15
TRANSMISSION LINE ALTERNATIVES RETAINED FOR FURTHER ANALYSIS (PRIMM PLANT SITE ALTERNATIVE)

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PROPOSED TRANSMISSION LINE

APPROX. SCALE

0 5 10 Miles

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A routing study was performed to identify potential alternatives that could be considered for the construction of the Ivanpah-Table Mountain Transmission Line. Results of a transmission line routing study that was conducted in 2001 for the Reliant Bighorn-Arden Transmission Line were reviewed to determine their applicability for the Ivanpah-Table Mountain Transmission Line.

An alternative that would parallel I-15 from Primm to the existing VEA Pahrump-Mead Transmission Line corridor was considered, but rejected due to potential impacts to development and operation of the proposed Ivanpah Valley Airport and due to potential visual impacts to travelers along I-15. An alternative that would parallel the KRGT pipeline corridor from the vicinity of Primm to the VEA Pahrump-Mead Transmission Line corridor also was considered but rejected due to potential adverse visual impacts that could be avoided by use of BLM-designated utility corridors east of I-15.

Two transmission line routes (Designated as Alternatives A and B) were selected as reasonable for construction of the single-circuit Ivanpah-Table Mountain Transmission Line. The alternatives are comprised of the following segments:

Alternative A – Segments 50, 30, 10

Alternative B – Segments 60, 50, 30, 10

Alternative A would closely parallel the existing Reliant Bighorn-Arden Transmission Line from Segment 50. Alternative B would closely parallel Segment 60 and other segments to the west. Segment 30 of both alternatives crosses the Desert Tortoise Translocation Area.

Features crossed by the Ivanpah-Table Mountain Transmission Line alternatives are shown in Table 3-15.

Table 3-15 Features Crossed – Ivanpah-Table Mountain Transmission Line

Alternatives	A	B
Segments	50, 30, 10	60, 50, 30, 10
Length (ft)	70,800	85,200
Length (mi)	13.4	16.1
Parallel to Linear Feature (ft)	70,800	85,200
Non-parallel to Linear Feature (ft)	0	0
Within BLM Utility Corridor (ft)	70,800	85,200
Not Within BLM Utility Corridor (ft)	0	0
Valley Floor Habitat (ft)	53,800	68,200
Mountain Habitat (ft)	0	0
Desert Tortoise Translocation (ft)	26,400	26,400
Desert Tortoise Cat. B (ft)	44,900	44,900
BLM Grazing Allotment (ft)	16,800	31,200
Special Use Areas (recreation) (ft)	43,900	58,300
Roach/Jean Lake Special Use Area (ft)	13,000	27,400
Public Lands Crossed (ft)	70,100	84,500
Private Lands Crossed (ft)	0	0
Transportation Corridor Crossed (ft)	1,200	1,200
Highway & Rail Crossings	4	4
Utility Line Crossings	1	1
Drainage Crossings*	8	13
Bighorn Sheep Winter Range	0	0
Bighorn Sheep Winter/Critical	0	0
Major PI Structures (estimated)	5	5
*Drainage crossings as determined from USGS Quads		

3.4.3 Transmission Line Structure Alternatives

Alternative transmission structure designs and colors were evaluated to provide options that could be considered for the interconnections among Ivanpah Energy Center, Table Mountain Substation, and Mead Substation. Although the range of options available include use of wood or steel H-frame structures to lattice structures, H-frame and lattice structures were not carried forward for further consideration. H-frame and lattice structures are not compatible with existing structures that are used throughout much of the proposed alignment, and they would occupy more land than would be required for construction of single-pole structures. Furthermore, the use of lattice structures is more applicable to lines carrying higher loads and voltages than that proposed for the IEC project. The use of wood structures (*i.e.*, single-pole wood) was eliminated from further consideration because it would result in greater maintenance requirements and reduced reliability than the use of steel structures.

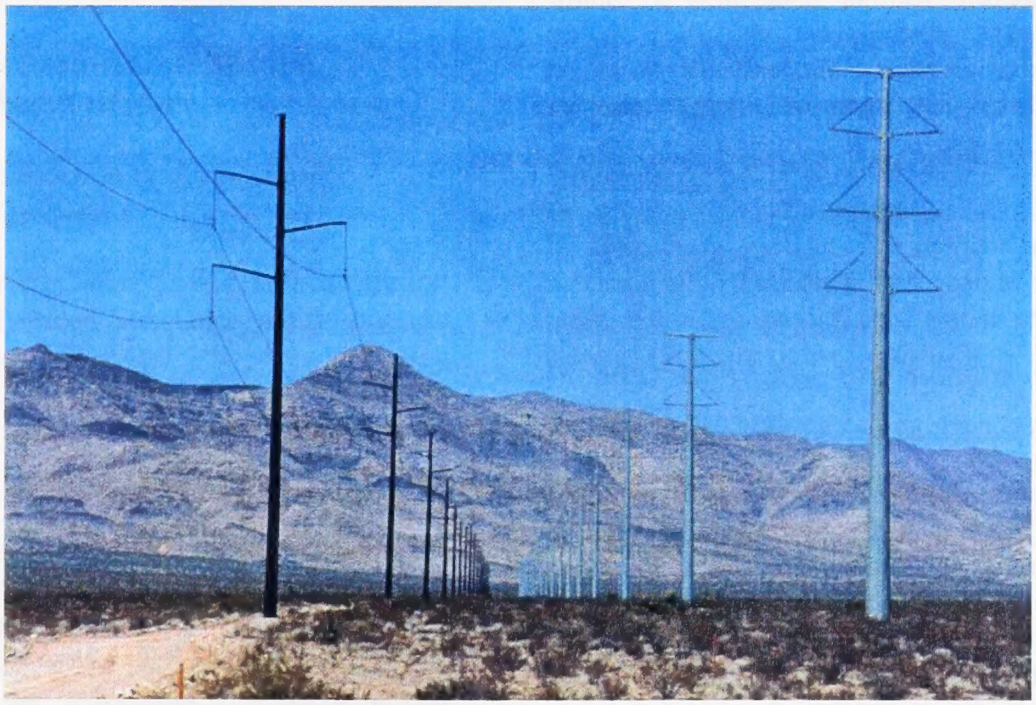
Two alternative tubular steel single-pole structure configurations were carried forward for further consideration because they are relatively inexpensive to install and maintain and because they would occupy less land than that of an H-frame or lattice structure. A combination of single-circuit and double-circuit structure configurations would be used within the interconnection between the IEC Substation to the existing VEA Pahrump-Mead transmission line corridor; a double-circuit structure would be used to parallel the existing Pahrump-Mead Transmission Line from the Ivanpah Switch to the Table Mountain Substation; and single-circuit structures would be used to cross Ivanpah Valley, the McCullough Range, and Eldorado Valley.

Regardless of configuration (single-circuit or double-circuit), single-pole tubular steel structures that would be used for the project would be either medium-gray painted or self-weathering steel (Coreten). Gray painted structures and Coreten structures are widely used throughout much of Clark County, Nevada by Nevada Power Company and Valley Electric Association, respectively. The existing VEA Pahrump-Mead Transmission Line is constructed in a single-circuit configuration on Coreten single-pole structures. The new Reliant Bighorn-Arden Transmission Line is constructed in a double-circuit configuration using gray painted tubular steel structures.

Figure 3-16 shows Coreten and painted gray structures used by VEA and Nevada Power Company. The Coreten structure is along the VEA Pahrump-Mead single-circuit Transmission Line; the gray painted structure is along the Reliant Bighorn-Arden Transmission Line (Nevada Power Company) double-circuit Transmission Line. Both lines are 230 kV. The photographs were taken near the I-15 crossing of both transmission lines, using a telephoto lens.



Photograph A



Photograph B

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FIGURE 3-16
TRANSMISSION LINE STRUCTURE ALTERNATIVES

The new structures would be approximately 90 to 110 feet in height. Most tangent structures would be directly imbedded to a depth of approximately 15 to 20 feet, with a nominal base diameter of approximately 3.0 feet. Some structures may be guyed or mounted to foundations to provide sufficient stability needed to meet angular forces. Dead end structures would be used where line direction changes would result in relatively high angular forces. The dead end structures would be more robust than tangent structures and would be mounted to a concrete and steel base. A nominal conductor span length of 700 feet would be used throughout the project; however longer or shorter span lengths would be used as engineering and safety requirements dictate.

3.4.4 Transmission System Modifications

Substation and Electrical Equipment

The Western Area Power Administration (Western) Mead Substation would provide the interconnection between Valley Electric Association (VEA) and the regional grid. Mead Substation is an existing facility located about 3 miles south of Boulder City, Nevada. The initial stage was constructed in the late 1960's with the most recent construction completed in 2000. The proposed connection would take place in the 230-kV area of the substation. Western would design, construct, own and operate the proposed equipment required for the interconnection.

A substation contains several different types of equipment arranged to carry out electrical functions, minimize safety risk, and accommodate operation and maintenance. The discussion below describes the equipment that would be installed.

Power Circuit Breakers

Circuit breakers automatically interrupt power flow in the event of an electrical fault. Two circuit breakers would be provided in the substation to connect to VEA. Gas circuit breakers are planned which use sulfur hexafluoride (SF_6) gas to extinguish the arc produced when the circuit breaker is opened. Small amounts of hydraulic fluids would be used to open and close the electrical contacts within the breaker. Sulfur hexafluoride is a potent greenhouse gas. The use, storage, and replacement of SF_6 would be monitored and managed by Western to minimize any releases to the environment. The breakers would be warranted against leakage and tested prior to installation. Once in operation, the breakers would be monitored for leaks to further minimize SF_6 leaks.

Disconnecting Switches

Disconnecting switches are devices used to mechanically disconnect or isolate equipment. Switches would be located on both sides of each circuit breaker.

Bus Tubing, Conductors, and Bus Supports

Electricity flows within a substation and between circuit breakers and other equipment through electrical aluminum tubing and stranded aluminum conductors. The bus tubing and conductors are elevated by bus supports and isolated from the bus supports by porcelain station post insulators. The bus supports would be grounded in accordance with the National Electrical Safety Code.

Substation Fence

The existing fence is chain-link topped with three strands of barbed wire. Adequate space exists within the fence to maneuver construction and maintenance vehicles. The fencing is grounded in accordance with the National Electrical Safety Code.

Substation Rock Surfacing

A 16-centimeter (6-inch) layer of rock selected for its insulating properties exists within the substation to help protect operation and maintenance personnel from electrical danger in the event of electrical failures.

Control Building

Electric/electronic controls and monitoring equipment for the power system would be housed in the existing control building within the substation. The control building is heated and air-conditioned to provide a controlled environment for equipment. Electrical service is provided by a station-service transformer that provides 120/240-volt service to the control building.

Transmission Interconnection

The proposed substation additions would be located in the southeast portion of the 230-kV area. Western proposes to install three new turning dead end structures to connect the incoming transmission line. Each turning structure would be a single-pole structure, and provide for right-angle turns of 90 degrees or greater. It is envisioned that the new structures would be located within Mead Substation. New conductors would be installed from the new turning structures to an A-frame tubular steel take-off structure, and between the take-off structures and bus tubing within the substation. Typical dead end turning structures (or one of similar design) and a take-off structure are shown on Figure 3-17.

Communication Facilities

Fiber optic ground wire would be installed for the entire length of the Ivanpah-Mead Transmission Line for grounding purposes and communications. Redundant communications requirements have not been determined; however, if required, an existing microwave tower within the Mead Substation would be utilized.

3.5 NO ACTION ALTERNATIVE

The No Action Alternative would preclude construction of the Ivanpah Energy Center power plant or any components of the facility. Under such a scenario, existing conditions would remain in their present state and the purpose and need for the facility would not be met.

3.6 SUMMARY OF ALTERNATIVES RETAINED FOR FURTHER CONSIDERATION

The alternatives analysis resulted in retention of the Proposed Goodsprings Plant Site (Alternative E) and the Primm Plant Site (Alternative F) for further consideration. A water treatment plant would be constructed on one of two 0.7-acre parcels, regardless of plant site alternative.

A water supply pipeline to the Proposed Goodsprings Plant Site would largely parallel the UPRR and be co-located within the BLM-designated Utility Corridor and Ivanpah-Mead #2 Transmission Line corridor to the plant site. Three plant site access options were



PHOTO A:

Take-off Structure



PHOTO B:

Typical Dead-End Structure or Similar Design

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FIGURE 3-17
SAMPLE STRUCTURE PHOTOS

identified to interconnect the facility to Table Mountain Substation and the existing Pahrump-Mead Transmission Line. Construction of the Ivanpah-Mead #2 Transmission Line would be along one of two alternatives. Four electrical interconnection plant site access options were identified to interconnect the Table Mountain Substation, the existing Pahrump-Mead Transmission Line, and the Ivanpah-Mead #2 Transmission Line.

A water supply pipeline to the Primm Plant Site would largely parallel the east side of the UPRR ROW and/or be located within a BLM-designated Utility Corridor. Four Ivanpah-Mead Transmission Line alternatives and two Ivanpah-Table Mountain alternatives were identified for further consideration. A natural gas supply pipeline would be constructed from the Kern River Gas Transmission project to the plant site.

Alternatives and options that were retained for further consideration for the Goodsprings and the Primm plant sites are summarized in Table 3-16.

Table 3-16 Summary of Alternatives Retained for Further Consideration

Project Component	Alternative E – Proposed Goodsprings Site	Alternative F – Primm Plant Site
Access Roads	Northern Access (County Road 53Y), 7,200-foot-long, 10-foot-wide to be paved to 20-foot-wide, plus 3-foot-wide shoulders.	Existing Reliant Bighorn access road would be used for construction and operation. No additional access roads required.
	Southern Access (existing 14,000 foot-long, 10-foot-wide trail would be bladed to a width of 18 feet).	
Natural Gas Pipeline	Direct connection to plant site. No routing analysis required.	3.2-mile-long pipeline from KRGT to plant site, parallel to natural gas pipeline corridor to be used by Reliant Bighorn.
Telecommunications Line	1,400-foot-long, buried adjacent to KRGT Compressor Station road, plus 7,200-foot-long buried within the northern access road shoulder.	Telecommunications will be through same vendor as Reliant Bighorn.
Water Treatment Plant	To be located on two similar sites (two 0.7-acre sites near SNCC)	
Water Supply Pipeline Route	West of UPRR ROW and within the VEA transmission line corridor (57,560 linear feet, 10.9 linear miles).	Parallel east side of UPRR ROW (57,800 linear feet, 10.9 linear miles).
		Parallel east side of UPRR ROW and within transmission line corridors (72,000 linear feet, 13.6 linear miles).
Water Supply Pipeline Plant Site Access Options	Across the mountain, west of plant site	Access options not applicable.
	Traversing the southern slope of the mountain, north of Desert Tortoise Translocation Area fence.	
	Parallel to existing trail, around the southern toe of the mountain, south of Desert Tortoise Translocation Area fence.	
Transmission Line Alternatives	Alternatives C and E - 250,600 to 252,260 linear feet.	Alternatives A, B, C, and D – 285,900 to 298,700 linear feet.

Project Component	Alternative E – Proposed Goodsprings Site	Alternative F – Primm Plant Site
Transmission Line Plant Site Access Options	Five circuits across the mountain (three corridors, 4,200 linear feet each).	Access options not applicable.
	Five circuits traversing the southern toe of the mountain, north of Desert Tortoise Translocation Area fence (three corridors, 6,560 linear feet each).	
	Five circuits parallel to an existing trail, around the toe of the mountain and south of the Desert Tortoise Translocation Area fence. (three corridors, 7,280 linear feet each).	
	One circuit across the mountain, four circuits traversing the toe of the mountain (one corridor 4,200 linear feet, plus two corridors 6,560 or 7,280 linear feet each).	
Structure Type Options	Gray-painted single-pole tubular steel.	
	Coreten single-pole tubular steel.	
No Action Alternative	No Action Alternative Retained	

SECTION 4

AFFECTED ENVIRONMENT

4.1 GEOLOGY AND MINERALS, SEISMICITY, SOILS, AND MINING

4.1.1 Geology

The proposed project and alternatives are located in the central portion of the Basin and Range Province (BRP). A distinctive feature of the BRP is a topographic pattern consisting of parallel, north-trending mountain ranges and intervening fault-bounded sedimentary basins. Rock units in the region span the geologic time scale from the Precambrian to the present (Stewart, 1980). Basin-fill deposits typically include alluvium, eolian, and lacustrine sediments and in the Ivanpah Valley they are probably several thousand feet thick (Burbey, 1997). The lithologies exposed within the mountain ranges include sedimentary rocks such as quartzite, shale, dolomite, and limestone; metamorphic rocks such as gneiss, schist, and phyllite; igneous intrusive rocks such as granite stocks and basalt dikes; and a diverse suite of volcanogenic deposits (Stewart and Carlson, 1978). The older rocks have commonly been affected by tectonic events and have undergone at least some structural deformation and metamorphism. Tertiary-age volcanic deposits have been identified on the eastern flank of the Lucy Gray Mountains (Longwell *et al.*, 1965); whereas, the mountains on the west side of Ivanpah Valley are composed of crystalline rocks overlain by Upper Precambrian and Lower Paleozoic formations that are interpreted to be continental shelf deposits (Stewart, 1980).

High crustal heat flow, regionally elevated topography, active faults, and seismicity are characteristic of the BRP (Eaton, 1982; Guth *et al.*, 1988; Zoback *et al.*, 1981). In the southern Nevada region, where the project site is located, most of the crustal extension is thought to have occurred 10 to 16 million years ago and involved strike-slip faulting and normal and detachment faulting (Wernicke *et al.*, 1988; Duebendorfer and Wallin, 1991). Significant extension in the Las Vegas area is thought to have ended five million years ago (Wernicke *et al.*, 1988). However, Quaternary normal-faults bound several mountain ranges in southern Nevada and the nearby Death Valley-Furnace Creek fault system is considered to be one of the most tectonically active structures in the BRP (Dohrenwend *et al.*, 1991; Harmsen, 1991; Hart and Bryant, 1999). Information regarding the origin of mountains bounding the Ivanpah Valley is conflicting. Regional geologic maps do not indicate range-front BRP-type faults along the mountains on either side of the valley. However, older rocks of the region have been affected by past tectonic events involving structural deformation and faulting, as evidenced in the mountains along the west side of the Ivanpah Valley (Spring Mountain Range) (Burchfiel and Davis, 1981). More recent fault activity has been associated with BRP extensional tectonics.

4.1.2 Minerals

Leasable Minerals

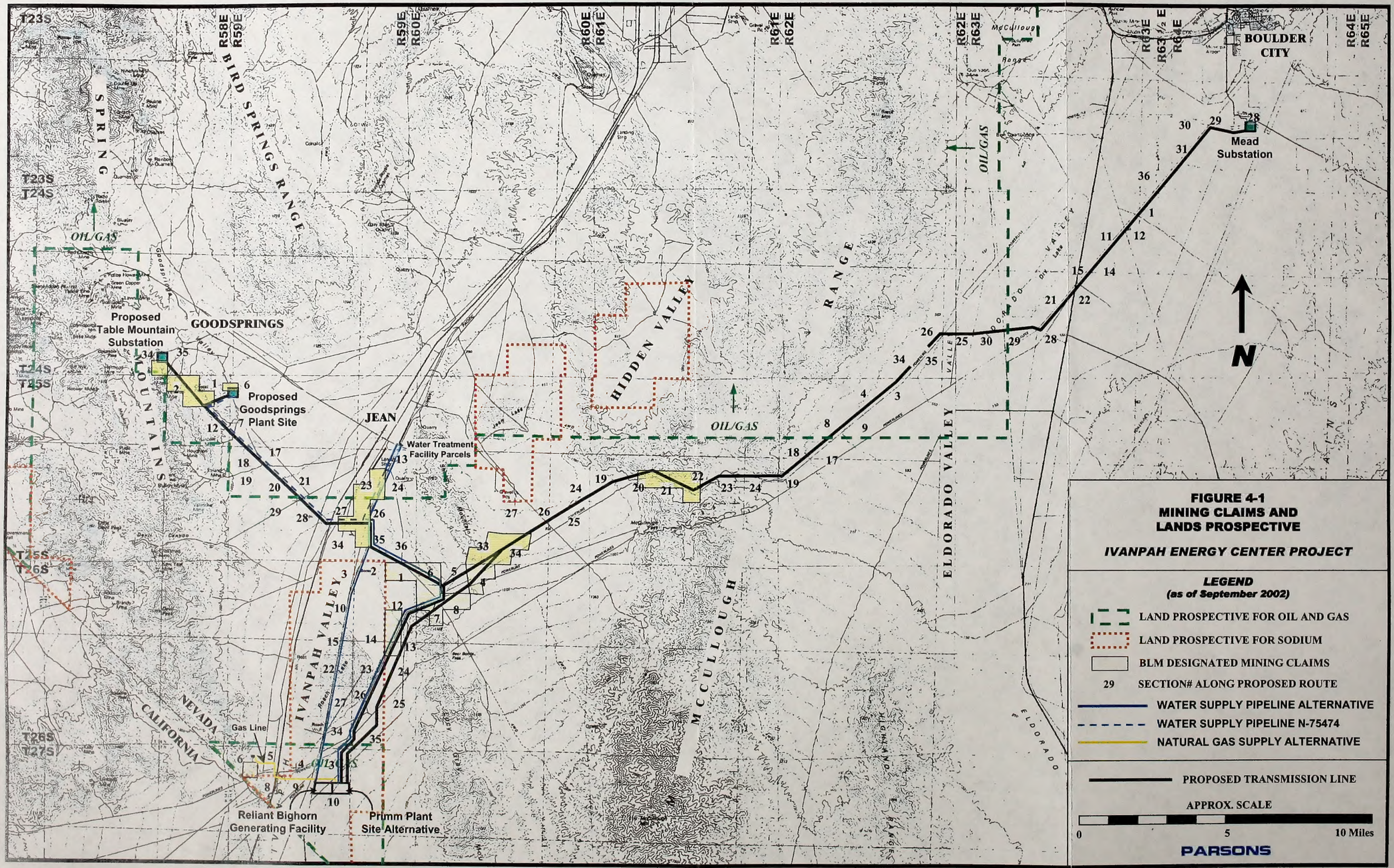
Leasable minerals are fuels and certain other minerals leased by the federal government to parties interested in developing these natural resources. These resources include oil and gas, oil shale, geothermal resources, sodium, potassium, phosphate, and coal. The Minerals Leasing Act (1920), the Acquired Lands Act (1947), the Geothermal Steam Act (1970), and 43 CFR 3100-3599 provides regulatory guidance for the management of mineral leases. Known sources of oil and gas have not been in the vicinity of the proposed rights-of-way (Longwell, *et al.*, 1965). Geologic conditions do exist for the potential of oil and gas near the proposed action (BLM, 1998; Map #3-11) (Figure 4-1). Occurrence of potassium and sodium has not been indicated (Longwell, *et al.*, 1965). Based on geologic conditions, lands prospective for potassium and sodium are mapped in areas east and northeast of Jean, and in the area surrounding Primm and Roach Lake (BLM, 1998; Map #3-11) (Figure 4-1). There are no known sources or potential sources of coal, geothermal resources, oil shale, and phosphate in the areas that would be affected by the proposed rights-of-way (Longwell, *et al.*, 1965; Nevada Land Classification Status Map, 1965; Gere, *et al.*, 1955).

The proposed project site, the interconnect transmission corridor between the generating facility and the Pahrump-Mead Transmission Line corridor, and the water supply pipeline from the Pahrump-Mead Transmission Line corridor to the generating facility are located in areas of moderate potential for oil and gas (URS, 2001). No land near the proposed project site, interconnection transmission corridor, or water supply pipeline is leased for oil and gas recovery. Sodium and potassium potential is designated as low for many miles in all directions from the project site (BLM, 1998). Disposal of leasable minerals is discretionary by the BLM.

Southern Nevada contains no known favorable locations for the development of geothermal energy. A geothermal water temperature of 145 Fahrenheit (°F), the hottest in Clark County, occurs at Black Canyon Springs, near Hoover Dam. Commercial geothermal development requires temperatures of at least 194^0F (VEA, 1994).

Locatable Minerals

Federal statutes do not describe what constitutes a "valuable mineral deposit" under the Mining Law of 1872, as amended. However, several government judicial and administrative decisions have adopted an "economic" definition of locatable minerals that has resulted in a test that is known as the "prudent man rule," that makes use of the concept of an economic ore body. In an 1894 court decision, locatable minerals were defined as those of such character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success in developing a valuable mine. The prudent man rule was subsequently expanded in 1968 to apply a "marketability test" that considers economics. The marketability test adds to the prudent man rule to require the claimant to show a reasonable prospect of selling minerals from a claim or group of claims.


T23S
T24S
T25S
T26S
T27S
R58E
R59E
R60E
R61E
R62E
R63E
R63 1/2 E
R64E
R65E
SPRING
BIRD SPRINGS RANGE
OIL/GAS
Proposed Table Mountain Substation
GOODSPRINGS
Proposed Goodsprings Plant Site
JEAN
Water Treatment Facility Parcels
HIDDEN VALLEY
RANGE
McCULLOUGH
ELDORADO VALLEY
BOULDER CITY
Mead Substation
IVANPAH VALLEY
NEVADA
CALIFORNIA
Gas Line
Reliant Bighorn Generating Facility
Primm Plant Site Alternative
N
FIGURE 4-1
MINING CLAIMS AND LANDS PROSPECTIVE
IVANPAH ENERGY CENTER PROJECT
LEGEND
(as of September 2002)
LAND PROSPECTIVE FOR OIL AND GAS
LAND PROSPECTIVE FOR SODIUM
BLM DESIGNATED MINING CLAIMS
29 SECTION# ALONG PROPOSED ROUTE
WATER SUPPLY PIPELINE ALTERNATIVE
WATER SUPPLY PIPELINE N-75474
NATURAL GAS SUPPLY ALTERNATIVE
PROPOSED TRANSMISSION LINE
APPROX. SCALE
0
5
10 Miles
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Map #3-14 of BLM's Resource Management Plan (RMP) indicates high mineral potential in the Spring Mountains found north and west of the Proposed Goodsprings site and Table Mountain Substation. There is also a moderate mineral potential where the proposed route traverses the McCullough Range.

The only potentially locatable minerals found in the vicinity of the proposed project alternatives are limestone-dolomite and silica sand deposits. Dolomite is mined at Sloan Hill, immediately north of Sloan and approximately seven miles from the northern segment of the proposed transmission line alignment. A second dolomite mine has been mapped on Sheep Mountain immediately east of Jean and approximately six miles from the southern segment of the proposed transmission line alignment.

Salable Minerals

Salable minerals are locatable minerals sold at fair market value and include common materials such as sand, gravel, pumice, scoria, or clay. The Materials Act (1947) and 43 CFR 3600-3622 provide for the regulation and disposal of salable minerals from BLM-administered land. Pumice, scoria, or clay is not known to exist in the vicinity of the proposed ROWs. Table 4-1 lists salable minerals and community pits in the project area.

4.1.3 Seismicity

Geologic hazards are natural physical conditions that can, when active, result in damage to the land and structures or injury to people. Such hazards typically include seismicity *(i.e.,* active faults, earthquakes, ground shaking, and soil liquefaction), slope stability (landslides), subsidence, flash floods and debris flows, volcanism, and avalanches.

Faults

The project area is in an area with a relative paucity of known potentially active faults (URS, 2001). Regional geologic maps do not show faults on the Nevada side of Ivanpah Valley, nor are there range-front BRP-type faults along the mountains on either side of the valley (Longwell, *et al.* 1965; Stewart and Carlson, 1978).

The area is classified as "Seismic Zone 2B" in the Uniform Building Code (ICBO, 1988). Seismic Risk Zone 4 is the highest category of seismic risk; Seismic Risk Zone 1 denotes low seismic risk. The seismic zone 2B factor, which is used to determine facility designed resistance to lateral seismic shaking forces, is half that of Zone 4 and 2.7 times that of Zone 1. Structures, their foundations, and equipment anchors must be designed according to the latest edition of the Uniform Building Code that has been adopted by the relevant permitting agency of jurisdiction at the time of issuance of the building permits.

The current level of seismicity in southern Nevada is relatively low compared to more active parts of the BRP (Rogers *et al.*, 1991; Harmsen, 1991). There have been no major earthquakes (greater than 6.0 magnitude) in the vicinity of Las Vegas since at least 1852. The record of seismicity in southern Nevada is dominated by small earthquakes that generally occur in two areas: in the vicinity of the Nevada Test Site and in the Lake

Table 4-1 Salable Minerals Within the Project Area

Location	Aliquot Part	Casetype
T25S, R59E, SECT.23	NENE,S2NE,W2,SE;	COMMUNITY PIT
T25S, R59E, SECT.23	NENE,S2NE,W2,SE;	COMMUNITY PIT
T25S, R59E, SECT.24	ENTIRE SECTION	COMMUNITY PIT
T25S, R59E, SECT.24	ENTIRE SECTION	COMMUNITY PIT
T25S, R59E, SECT.26	ENTIRE SECTION	COMMUNITY PIT
T25S, R59E, SECT.26	ENTIRE SECTION	COMMUNITY PIT
T25S, R59E, SECT.27	ENTIRE SECTION	COMMUNITY PIT
T25S, R59E, SECT.27	ENTIRE SECTION	COMMUNITY PIT
T25S, R59E, SECT.35	ENTIRE SECTION	COMMUNITY PIT
T25S, R59E, SECT.35	ENTIRE SECTION	COMMUNITY PIT
T25S, R59E, SECT.36	ENTIRE SECTION	COMMUNITY PIT
T25S, R59E, SECT.36	ENTIRE SECTION	COMMUNITY PIT
T25S, R60E, SECT.24	ENTIRE SECTION	COMMUNITY PIT
T25S, R60E, SECT.26	ENTIRE SECTION	COMMUNITY PIT
T25S, R60E, SECT.27	ENTIRE SECTION	COMMUNITY PIT
T25S, R60E, SECT.33	ENTIRE SECTION	COMMUNITY PIT
T25S, R60E, SECT.34	ENTIRE SECTION	COMMUNITY PIT
T25S, R60E, SECT.33	E2NESE;	MIN MAT NEGOTIATED
T25S, R60E, SECT.34	NWNWSW;	MIN MAT NEGOTIATED
T25S, R60E, SECT.34	SWSWNW;	MIN MAT NEGOTIATED
T25S, R60E, SECT.34	ENTIRE SECTION	MIN MAT SALE-COMP
T25S, R60E, SECT.33	ENTIRE SECTION	MIN MAT SALE-COMP
T25S, R60E, SECT.34	ENTIRE SECTION	MIN MAT SALE-COMP
T25S, R61E, SECT.19	NW4NE4;	MIN MAT NEGOTIATED
T26S, R59E, SECT.1	ALL (EXCLUDING R/W);	COMMUNITY PIT
T26S, R59E, SECT.1	ALL (EXCLUDING R/W);	COMMUNITY PIT
T26S, R59E, SECT.1	SE;	MIN MAT SALE-COMP
T26S, R60E, SECT.4	ENTIRE SECTION	COMMUNITY PIT
T26S, R60E, SECT.6	S2SENW,N2NESW;	MIN MAT NEGOTIATED
T26S, R60E, SECT.8	NW;	MIN MAT EXPL PMT

Mead area, which may be related to strain release in the crust after the lake was filled (PBS&J, 2002; Rogers, *et al.*, 1991; Rogers and Lee, 1976). The University of Nevada at Reno (UNR) provides information on earthquakes in Nevada and Eastern California (UNR, 2001). The UNR has published maps of the location (epicenter) and magnitude of earthquakes in Nevada from 1852 to 1988. These maps indicate a very large number of earthquakes over this period. However, the concentration of locations does not include Clark County.

The U.S. Geological Survey (USGS 2001) has developed isopleth maps showing areas of certain peak accelerations that may occur with a certain probability in a given time period due to seismic events. However, the proposed project area is in a zone of very low shaking potential.

None of the proposed facilities, pipelines, or transmission lines are on, cross, or near known active earthquake faults. The nearest potentially active fault is the Las Vegas shear zone, about 40 miles north-northeast of the Ivanpah area. The most recent activity on the Las Vegas shear zone was considered to be pre-Quaternary (older than 1.8 million years old); however, Slemmons, *et al* (2001) have new data that suggest possible Quaternary activity.

Earthquakes

Although Nevada is located within the Basin and Range physiographic province, one of the most seismically active regions in the United States since 1852, only three earthquakes greater than magnitude 5.0 have been recorded in the project region of Clark County. The maximum recorded magnitude of these three earthquakes was a magnitude of 5.1 (UNR, 2001).

To quantify seismic hazards in any given region, the USGS has developed national maps of earthquake shaking hazards. Under the National Seismic Hazard Mapping Project, seismic hazard maps were updated in 1996. These maps are used to assess probabilistic seismicity and provide information used to create and update design provisions of building codes in the United States. The codes provide design standards for buildings, bridges, highways, and utilities such as natural gas pipelines. Values on these seismic hazard maps are expressed as a percentage of the acceleration of gravity, which is 32 feet per second squared, and represent the change in velocity of ground movement; the higher the value, the greater the potential hazard. The project area has a peak acceleration typically less than 10 percent gravity with a 1 in 10 chance of being exceeded in 50 years (USGS 1996).

Soil Liquefaction

Secondary seismic effects triggered by strong ground shaking are often more serious than the shaking itself. Soil liquefaction is a phenomenon in which saturated, cohesionless soils temporarily lose their strength and liquefy when subjected to dynamic forces such as intense and prolonged ground shaking. Soil liquefaction typically occurs when the water table is less than 50 feet below the ground surface and the soils are predominantly unconsolidated. The potential for soil liquefaction increases as groundwater approaches the surface. For soil liquefaction to occur, a relatively shallow water table; rapid, strong ground

motions; and susceptible soils must all be present. Depth to groundwater within the vicinity of Jean typically exceeds 300 feet below land surface which substantially reduces the possibility of liquefaction.

Subsidence

Subsidence, which is the loss of surface elevation due to the removal of subsurface support, is one of the most diverse forms of ground failure, ranging from small or local collapses to broad regional lowering of the earth's surface. Causes of subsidence can include dissolution in limestone aquifers (karst topography), first-time wetting of moisture-deficient low-density soils (hydrocompaction), past and present underground mining, and withdrawal of fluids (groundwater, petroleum, geothermal). Subsidence due to karst topography or underground mining activities is not anticipated. However, there is a potential for subsidence resulting from hydrocompaction and excessive withdrawal of groundwater.

Hydrocompaction, sometimes referred to as collapsing soil or near-surface subsidence, results from the settling of the ground surface in response to wetting of moisture-sensitive soils and could occur in the project area. Hydrocompaction is caused by the consolidation of dry, loosely compacted, low-density sediments with high void ratios and high dry strength. Should these soils become wet by processes such as long-term ponding of water, irrigation, or broken water lines, settlement of the ground surface of up to 10 percent of the total thickness of the susceptible sediments could result. Holocene alluvial fans and many Quaternary fans in the BRP are potentially susceptible to some degree of soil collapse if they become fully saturated.

Subsidence due to excessive groundwater withdrawal could occur along the route. Groundwater withdrawal-induced subsidence occurs in response to a change from saturated to unsaturated conditions in unconsolidated sediments. This type of subsidence is most prominent in areas underlain by thick deposits of unconsolidated alluvial deposits. Deposits consisting of mainly clay and silt-sized particles are susceptible to subsidence of greater magnitude than deposits consisting of sand and gravel-sized particles. The large withdrawal of groundwater from the generally unconsolidated alluvial sediments underlying Las Vegas has resulted in local surface subsidence of as much as 6 feet since the 1930s. Subsidence due to water table decline is generally a slow process that occurs over broad areas.

Flash Floods and Debris Flows

All ephemeral drainages in the BRP are susceptible to flash flooding during heavy rain events, and could be subject to debris flows. Debris flows may be generated when hillside colluvium material becomes rapidly saturated with water and flows into a channel. Intense rainfall, rapid snowmelt, and high levels of groundwater flowing through fractured bedrock can trigger the movement. Such areas are typically limited to drainages that originate in unconsolidated sediments or landslide deposits.

Volcanism

Hazards associated with volcanic activity include eruptions, lava flows, flowing avalanches, ash flows, volcanic mudflows (lahars), tephra falls, and emission of volcanic gases. Volcanic activity has not been recorded in the Ivanpah Valley during recent times.

4.1.4 Soils

Soils in the area of the proposed project are classified as "Shallow-Very Shallow Gravelly Coarse Textured" with low susceptibility to erosion (BLM, 1998). Basin-fill sediment in the Ivanpah Valley is believed to range from several hundred to several thousand feet thick. The basin-fill sediment is alluvial fan deposits from the nearby mountains. The mountains on the west side of the Ivanpah Valley are composed of Paleozoic formations that are interpreted to be continental shelf deposits. Mountains on the eastern side of the Ivanpah Valley (McCullough Range) are predominantly composed of Precambrian crystalline rocks and Tertiary volcanics. Depositional processes on the fan are likely dominated by the fluvial transport of sediment in shallow washes and in overland sheetflow (NOAA, 1999.) There is potential for wind erosion in some areas, if the land is disturbed.

4.2 GROUNDWATER AND SURFACE WATER RESOURCES

The Ivanpah Valley is a linear basin extending approximately 40 miles along a north-south trending axis. Roughly two-thirds of the valley lies south of the Nevada state line, in California. The Nevada portion of Ivanpah Valley is bounded by the Lucy Gray Mountains and McCullough Range on the east, and by the southern part of the Spring Mountain Range on the west. The California portion of the valley is bordered by the New York Mountains to the south, and the Ivanpah Mountains, Mescal Range, and Clark Mountains on the west. There are two playa lakebeds in Ivanpah Valley: Roach Lake in Nevada, and Ivanpah Lake in California. Eldorado Valley is bordered on the west by the McCullough Range and on the east by the Eldorado Mountains. Eldorado Lake is a playa between the two mountain ranges.

4.2.1 Hydrology

Ivanpah Valley and Eldorado Valley are closed desert basins within the hydrogeologically defined Great Basin. The valleys are located at the southern end of the Colorado River regional groundwater flow system and include numerous topographic basins extending southward from Long Valley in east-central Nevada to Ivanpah Valley in California (Harrill, *et al.*, 1988). The basins within this flow system are thought to be hydrogeologically connected by a regional aquifer within the underlying carbonate bedrock.

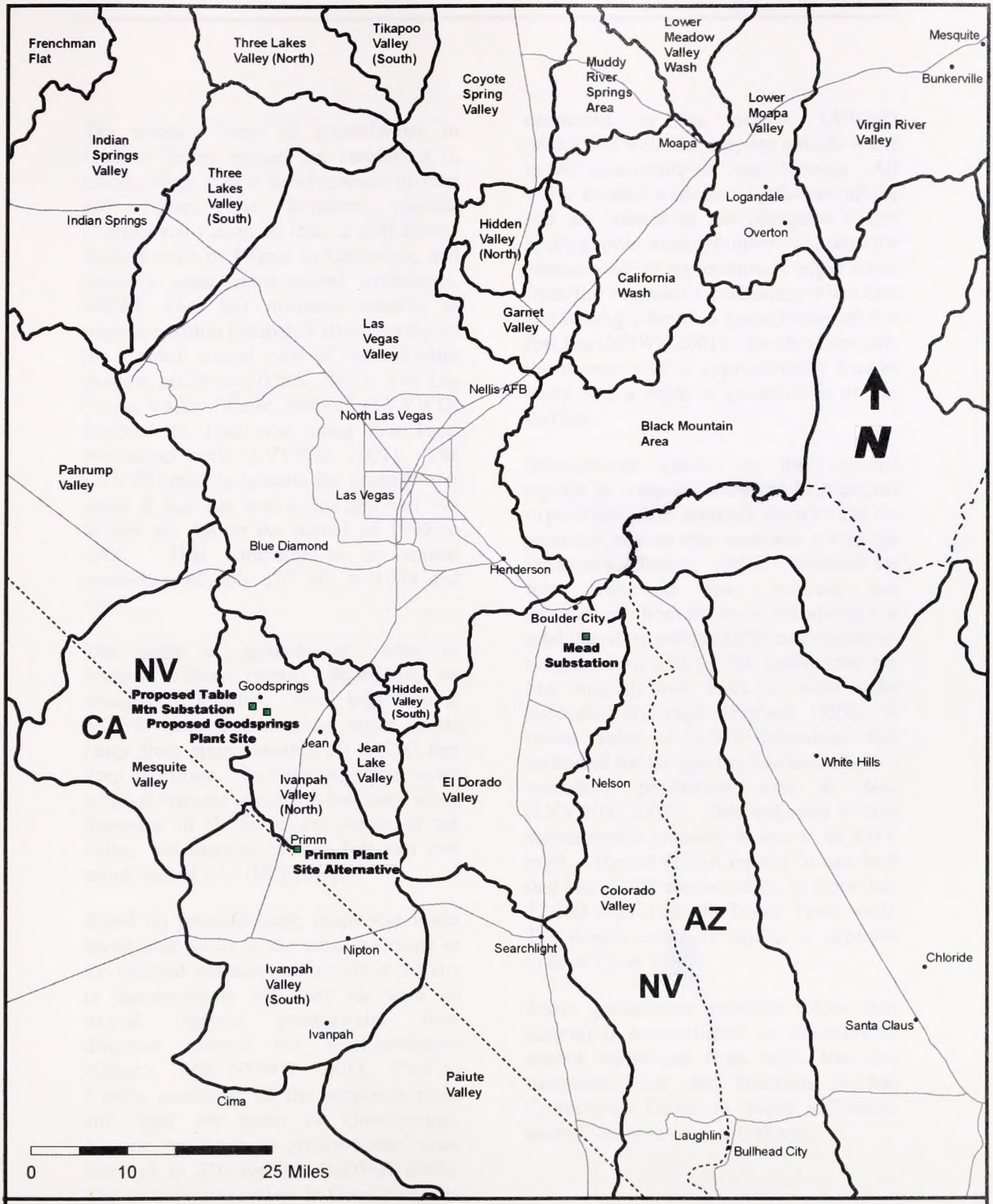
The regional carbonate aquifer is confined laterally at contacts with non-pervious rocks and at structural barriers to groundwater flow. With respect to vertical movement of water, the regional aquifer cannot generally be described as either confined or unconfined. Limited data indicate there are locations where the behavior of wells and springs suggests the aquifer is confined; whereas, the opposite may be indicated at another location (Dettinger, *et al.*, 1995).

Much of the potable water for Southern Nevada communities comes from ground-water that is present in a series of hydrographic basins. These basins are under the jurisdiction of the Nevada Division of Water Resources (NDWR). Most of the basins in Southern Nevada have been "designated" by the NDWR, meaning that NDWR can declare preferred uses in those basins. NDWR recognizes two hydrographic sub-areas in the Ivanpah

Valley. The Proposed Goodsprings Plant Site and the Primm Plant Site Alternative are located in the Ivanpah Valley hydrographic basin north (#164A) a designated basin established by the NDWR per Nevada Revised Statute (NRS) 534.030 (Figure 4-2).

Available information is sparse concerning groundwater resources in the Ivanpah Valley. Groundwater recharge in the valley is estimated by Harrill, *et al.*, (1988) at only about 2,200 acre-feet per year (afy). Groundwater occurs in the valley-fill deposits and in fractures and solution cavities within the deeper carbonate bedrock of the regional aquifer system. Valley-fill aquifers in most basins are connected to some degree with the underlying carbonate aquifer. In Ivanpah Valley, the hydraulic connection between basin fill and the underlying carbonate rocks is probably good (Burbey, 1997). The valley-fill sediments of Ivanpah Valley (north) are as much as several thousand feet thick and contain an estimated 1.7 million acre-feet of groundwater in storage (Burbey, 1997). Groundwater flows in a northerly direction within these sediments, following the axis of the valley (Harrill, *et al.*, 1988). As a result of that northerly flow, the Nevada portion of the basin may average approximately 800 afy of groundwater recharge from the California portion (Glancy, 1968). An additional 700 afy of groundwater recharge for Ivanpah Valley (north) is derived from precipitation in the Spring Mountains. Any excess groundwater recharge not consumed by pumping or evapotranspiration is thought to leave the basin via subsurface flow to the Las Vegas Valley groundwater basin.

Well # 52732/52735 has been proposed by the project proponent as a supplemental water source. The well is cased to 630 feet below land surface (bls) and screened from 365 to 630 feet bls. The static water level is relatively constant at 360 feet bls (Johnson, 2002). Pumpage is permitted at 182.4 afy.



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FIGURE 4-2
HYDROGEOLOGIC BASINS

The primary users of groundwater in Ivanpah Valley include the residences in Goodsprings, casino developments in Jean and Primm, the Southern Nevada Correctional Center at Jean, a golf course located south of Primm in California, and possibly some mine-related operations. NDWR does not maintain records of pumpage within Ivanpah Valley (north), so the overall annual rate of groundwater usage is not known (URS, 2001). The Las Vegas Valley Water District (LVVWD) services the Jean area using four local production wells (LVVWD, 2001). The LVVWD records indicate the groundwater usage at Jean has been in the range of 544 to 690 afy during the period of 1995 to 2000. That compares to an annual production of only 107 afy in 1989 and 1990.

The depth to groundwater varies in Ivanpah Valley (north), depending on topographic location. Well logs filed at NDWR indicate that static water levels range from approximately 80 to 200 feet deep at Primm. In contrast, static water levels at Jean are about 360 feet deep along Interstate 15 (I-15), in the center of the valley, but increase to 570 feet just two miles west of I-15 (URS, 2001).

Based on potentiometric maps and water levels from wells in the area, the depth to the regional groundwater aquifer at the site is approximately 850 feet bls with an overall regional groundwater flow direction toward the west-northwest (Glancy, 1968; NDWR, 2001). Two to 3 miles northwest of the proposed plant site, near the town of Goodsprings, Nevada, the depth to groundwater varies from 18 to 350 feet bls (NDWR 2001). The groundwater system in Goodsprings is interpreted to be locally perched and not connected to the nearest LVVWD production well that supplies potable water to the community of Jean, Nevada. All wells located west and southwest of the site are located in the Mesquite Valley hydrographic basin (Number 163) with the closest well at approximately eight miles from the Proposed Goodsprings Plant Site and having a depth to groundwater of 300 feet bls (NDWR 2001). South of the site, the nearest well is approximately 8 miles away with a depth to groundwater of 115 feet bls.

Groundwater quality in the regional aquifer in Ivanpah Valley can be marginal to poor for use as drinking water due to the presence of evaporite minerals within the sediments (Burbey, 1997). Records for four wells at Jean indicate that groundwater from the basin-fill aquifer has total dissolved solids (TDS) concentrations ranging from 350 to 920 milligrams per liter (mg/L), with three of those wells exceeding 600 mg/L (Burbey, 1997). A recent value of 1,950 microhms was measured for the specific conductivity in a secondary production well at Jean (LVVWD, 2001). This indicates a TDS concentration probably in excess of 1,000 mg/L. Hewett (1956) reports of one well that had a TDS concentration of more than 27,000 mg/L (the old Borax Team well). The deeper carbonate aquifer is expected to have lower TDS.

Some groundwater recharge (other than natural) is accomplished by discharge of treated wastewater from some Jean-area businesses and the Southern Nevada Correctional Center to "rapid infiltration basins" for groundwater recharge.

4.2.2 Drainage

The Clark County Regional Flood Control District has developed a "Surface Hydrology and Drainage Facilities" map showing the general location of major washes and the 100-year flood plains in the South (Clark) County Planning Area. The District also has identified regional drainage facilities included in their 10-year work program of construction.

Several government entities are involved with drainage and flood control in Clark County. The Clark County Department of Public Works requires a drainage study of development locating in areas of special flood hazard. Drainage flows resulting from a project must not impact downstream or adjacent areas.

The Clark County Regional Flood Control District, whose jurisdiction covers cities and unincorporated areas of Clark County, has planned a number of facilities that will help to protect the communities in the South County Planning Area from major flooding. These facilities are described in the District's *Master Plan Update for Outlying Areas*, adopted in 1991, shows combinations of detention and conveyance structures that will help protect communities from the effects of 100-year floods. The Federal Emergency Management Agency (FEMA) requires that development proposed in FEMA-designated Special Flood Hazard Areas (SFHA) be protected by physical structures or insurance.

The Goodsprings and Primm sites, and all areas within at least a mile in all directions, are located outside the 100-year flood plain of SFHA. The project sites also are at least several miles from any proposed Drainage Facilities in the Flood Control District's Master Plan (Clark County 1994).

4.3 BIOLOGICAL RESOURCES

The Ivanpah Valley lies within the northeastern Mojave Desert. The Mojave is the smallest of the four North American deserts, lying primarily in California, but also including the southern quarter of Nevada and two small extensions into western Arizona (Larson, 1977). It is bordered by the southern Sierra Nevada Mountains on the west, the Great Basin Desert to the north, the Colorado River to the east, and the San Bernardino Mountains and the Sonoran Desert to the south. The project area encompasses the eastern base of Table Mountain in the Spring Mountain Range, Ivanpah Valley, Lucy Gray Mountains, McCullough Range, and Eldorado Valley. The Spring Mountains region is geographically bounded by Goodsprings Valley on the east and Mesquite Valley on the west.

The region is marked by extreme weather conditions. The climate is arid, accompanied by extreme temperatures ranging from 20°F to more than 100°F. Overall precipitation is very low, with erratic rainfall patterns that tend to be localized. Mean monthly precipitation recorded at McCarran Airport (1950 – 1994) ranges from a low 0.12 inches in June to a high of 0.49 inches in August (National Climatic Data Center, 1995). Distribution of vegetation in this area is strongly influenced by variations in elevation and soil type.

4.3.1 Plant Communities

Field investigations were carried out during April and May 2002 to identify dominant communities that could be affected by construction of the Ivanpah

Energy Center, access roads, water treatment plant, water supply pipeline, and transmission lines. In the following discussion, references to numbered segments refer to the transmission line corridor segments identified in Section 3.4.5. Plant communities that were observed to be in the project area are described in the following text. Field data are provided in Appendix C. Information provided in the following text has been supplemented from results of field investigations that were carried out during 2001 for the Reliant Bighorn (Primm Site) project.

Creosote Bush – White Bursage (*Larrea tridentata – Ambrosia dumosa*) Community

Creosote Bush–White Bursage Community is found at lower elevations, most commonly from the bottom to the edges of broad alluvial valleys and on low hills. It is dominated by creosote bush and white bursage. Other common plants in the community include big galleta grass (*Hilaria rigida*), white burrobrush (*Hymenoclea salsola*), diamond cholla (*Opuntia ramosissima*), silver cholla (*Opuntia echinocarpa*), ratany (*Krameria erecta*), Russian thistle (*Salsola tragus*), plantain (*Plantago* sp.), desert globemallow (*Sphaeralcea ambigua*), and Mediterranean grass (*Schismus barbatus*). Other, less common, species include Mohave yucca (*Yucca schidigera*), beavertail prickly pear (*Opuntia basilaris*), joint fir (*Ephedra fasciculata*), wire lettuce (*Stephanomeria* sp.), desert marigold (*Baileya multiradiata*), skeletonweed (*Eriogonum deflexum*), Booth's evening primrose (*Camissonia boothii*), barrel cacti (*Ferocactus cylindraceus* var. *lecontei*), snakeweed (*Gutierrezia sarothrae*), fluffgrass (*Dasyochloa pulchella*), and Indian ricegrass (*Achnatherum hymenoides*).

Brittlebush (*Encelia farinosa*) and buckhorn cholla (*Opuntia acanthocarpa*) also are present in eastern Eldorado Valley. In some areas, diamond cholla, buckhorn cholla, silver cholla, and Mohave yucca are much more common. Other plants occur along medium to large washes and include catclaw acacia (*Acacia greggii*), Cooper's wolfberry (*Lycium cooperi*), Anderson's wolfberry (*Lycium andersonii*), woolly brickellia (*Brickellia incana*), desert willow (*Chilopsis linearis*), dock (*Rumex hymenosepalus*), squaw waterweed (*Baccharis sergiloides*), four-wing saltbush (*Atriplex canescens*), wooly-fruited bursage (*Ambrosia eriocentra*), and Palmer's penstemon (*Penstemon palmeri*). Teddy bear cholla (*Opuntia bigelovii*) was only found on south facing slopes in the lower basalt foothills of the eastern side of the McCullough Range in Segment 70. At lower elevations with gravelly soils in the bottom of Ivanpah Valley and Eldorado Valley, the community is dominated by creosote bush, white bursage, white burrobrush, and Mediterranean grass. In sandier areas, big galleta grass is co-dominant with creosote bush and white bursage or even more dominant than creosote bush. Mediterranean grass is also common in sandy areas.

Mixed Scrub-Mixed Succulent Community

Although creosote bush, white bursage, and other species that are common within the Creosote Bush-White Bursage Community, they are far less common within the Mixed Scrub-Mixed Succulent Community. The Mixed Scrub-Mixed Succulent Community is found at higher elevations and on higher hills, (including

McCullough Pass) than other communities within the project area. Common species include: Mohave yucca, ratany, joint fir (*Ephedra fasciculatum* and *Ephedra nevadensis*), flat-top buckwheat (*Eriogonum fasciculatum*), paper bag bush (*Salazaria mexicana*), buckhorn cholla, diamond cholla, silver cholla, spiny menodora (*Menodora spinescens*), fluffgrass, fiddleneck (*Amsinckia intermedia*), peppergrass (*Lepidium* sp.), goldeneye (*Viguiera deltoidea*), big galleta grass, white burrobrush, blackbrush (*Coleogyne ramosissima*), Joshua tree (*Yucca brevifolia*), desert trumpet (*Eriogonum inflatum*), and barrel cacti. Other less common species documented in the community include catclaw acacia, snakeweed, narrowleaf goldenbush (*Ericameria linearifolia*), turpentine bush (*Ericameria laricifolia*), cottontop cactus (*Echinocactus polycephalus*), matted cholla (*Opuntia parishii*), Utah butterflybush (*Buddleja utahensis*), California brickellia (*Brickellia californica*), beavertail prickly pear, wire lettuce (*Stephanomeria* sp.), evening primrose (*Oenothera* sp.), desert globemallow, skeletonweed (*Eriogonum deflexum*), hedgehog cactus (*Echinocereus engelmannii*), coldenia (*Coldenia* sp.), shadscale saltbush (*Atriplex confertifolia*), desert marigold, Anderson's wolfberry, pincushion cactus (*Mammillaria tetrancistra*), mortonia (*Mortonia scabrella* var. *utahensis*), prince's plume (*Stanleya pinnata*), chia (*Salvia columbariae*), desert tobacco (*Nicotiana obtusifolia* var. *obtusifolia*), winterfat (*Krascheninnikovia lanata*), Mojave prickly pear (*Opuntia erinacea*), sandwort (*Arenaria* sp.), Heerman's buckwheat (*Eriogonum heermannii* var. *humilius*), Wright buckwheat (*Eriogonum wrightii*), cliffrose (*Purshia stansburiana*), desert stingbush (*Eucnide urens*), Palmer's penstemon, and purple sage (*Salvia dorrii*).

Other species occur along washes in the community, including desert willow, Cooper's wolfberry, woolly brickellia, Apache plume (*Fallugia paradoxa*), and Two-tone beardtongue (*Penstemon bicolor* ssp. *bicolor* and *P. bicolor* ssp. *roseus*). Both subspecies of two-tone beardtongue have been found by others in the vicinity of the project area but were not able to be positively identified during the April to May 2002 site visits due to the lack of flowering of most penstemons in the area and because their leaves are quite similar. However, given that *Penstemon bicolor bicolor, P. bicolor* ssp. *Roseus,* and *P. albomarginatus* have been found in the area previously, the seed source would be present within the habitat.

Blackbrush (*Coleogyne ramosissima*) Community

Although the Blackbrush Community is common and widespread in the upper elevational limits of the Mohave desertscrub biotic community, the only area within the limits of the project that has a blackbrush-dominated community is located along Segment 10, west of Crystal Pass. Other species that can be found in the community include Mohave yucca, Joshua tree yucca, creosote bush, joint fir, Prince's plume, snakeweed, Indian ricegrass, Anderson's wolfberry, and spiny menodora. Russian thistle and desert marigold occur in disturbed areas within the community, such as along roads and in other areas where vegetation was previously cleared.

Desert Saltbush (*Atriplex polycarpa*) – Creosote Bush Community

Desert Saltbush Community occurs on alkaline soils north and south of Eldorado Dry Lake, in the Eldorado Valley. The community occurs along Segments 110, 120, and 130. It begins at approximately one mile west of Eldorado Dry Lake and extends eastward along the northern and southern boundaries of the dry lake to Highway 95. Desert saltbush and creosote bush are co-dominant species. Other species that occur within this community include Mediterranean grass and fiddleneck, as well as some white bursage and rigid spiny herb (*Chorizanthe rigida*).

Stabilized Dune Community

The Stabilized Dune Community occurs east of Highway 95 along Segments 120 and 130. Within Segment 120, it occurs in relatively small patches near Highway 95, beginning about a half mile east of that highway. The community becomes relatively constant along Segment 120 until its junction with Segment 130. The community also occurs throughout Segment 140 and the Mead Substation area and along Segment 130 from its junction with Segment 120 to approximately one half mile southwest of that point. Dominant plants are creosote bush, dune primrose (*Oenothera deltoides*), desert dicoria (*Dicoria canescens*), and Russian thistle.

Saltcedar (*Tamarix* sp.) – Cattail (*Typha* sp.) Riparian Community

Saltcedar – Cattail Riparian Community is present along two earthen canals with running water that is crossed by Segment 120. Vegetation along the portions of the canals that could be crossed by the project were dominated by saltcedar and cattail, with a few large creosote bushes present at the outskirts of these communities.

4.3.2 Rare Plant Species

Rare plant surveys were conducted within areas that could be affected by project development or operations. The surveys concentrated on species that have been documented within the vicinity of the project area by the Nevada Natural Heritage Program (NNHP) (Appendix D) and included: white-margined penstemon (*Penstemon albomarginatus*), yellow two-tone beardtongue (*Penstemon bicolor* ssp. *bicolor*), rosy two-tone beardtongue (*Penstemon bicolor* ssp. *roseus*), Clokey buckwheat (*Eriogonum heermannii* var. *clokeyi*), Mohave milkvetch (*Astragalus mojavensis* var. *mohavensis*), Nye milkvetch (*Astragalus nyensis*), Spring Mountains milkvetch (*Astragalus remotus*), and sheep fleabane (*Erigeron ovinus*). Field survey notes are provided in Appendix C. Special status species that potentially could occur in the project are listed on Table 4-2.

Table 4-2 Special Status Plant Species Potentially Occurring in the Project Area

Common Name	Scientific Name	USFWS Status	BLM Status	State Status
Las Vegas bearpoppy	*Arctomecon californica*	Species of Concern	Sensitive Species	Critically Endangered
White bearpoppy	*Arctomecon merriamii*	Species of Concern	Sensitive Species	None
Spring Mountain milkvetch	*Astragalus remotus*	Species of Concern	Sensitive Species	None
Sheep fleabane	*Erigeron ovinus*	Species of Concern	Sensitive Species	None
White-margined beardtongue	*Penstemon albomarginatus*	Species of Concern	Sensitive Species	None
Yellow beardtongue	*Penstemon bicolor* ssp. *bicolor*	Species of Concern	Sensitive Species	None
Rosy twotone beardtongue	*Penstemon bicolor* ssp. *roseus*	Species of Concern	Sensitive Species	None
Cacti, yucca, and agave	Cactaceae and Agavaceae (= Liliaceae)	None	None	State-Protected Species under NRS 52.060-120

- ***Arctomecon californica*** **(Las Vegas bearpoppy)** is a federally-listed Species of Concern and a BLM Nevada Special Status Species - protected by Nevada State law and listed by the State as Critically Endangered. It occurs on gypsiferous soils, often with well-developed soil crust, in areas of generally low relief on all aspects and slopes at elevations ranging from 1,060 to 3,642 ft amsl. Distinguishing characteristics include large yellow blooms, nodding buds, and hirsute basal leaves. Typically, Las Vegas bearpoppy is not found in desert tortoise habitat because the two require different soil types. It is possible that gypsum outcrops possessing Las Vegas bearpoppy seed banks occur in the Bird Spring Range north of the project area.

- ***Arctomecon merriamii*** **(white bearpoppy)** is a federally-listed Species of Concern and a BLM Nevada Special Status Species - designated Sensitive by the State Office. It occurs on alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops at elevations between 2,000 to 6,280 ft amsl. Distinguishing characteristics include nodding buds and white blooms.

- ***Astragalus remotus*** **(Spring Mountain milkvetch)** is a federally listed Species of Concern

and a BLM Nevada Special Status Species - designated Sensitive by the State Office. It occurs in rocky, gravelly, or sandy calcareous soils derived from carbonate or sandstone in washes and drainages, or on hillsides or rocky ledges, with desert scrub or desert wash communities. Its elevation ranges from 3,400 to 7,050 ft amsl. According to the Natural Heritage Program, the Spring Mountain milkvetch was last recorded in 1905.

- ***Erigeron ovinus*** **(sheep fleabane)** is a federally-listed Species of Concern and a BLM Nevada Special Status Species - designated Sensitive by the State Office. It occurs in crevices in carbonate cliffs and ridgeline outcrops in the pinyon-juniper and montane conifer zones at elevations ranging between 3,600 and 8,400 ft amsl. Pinyon-juniper or montane conifer zone habitat does not occur in the project area; therefore, sheep fleabane is not expected to occur.
- ***Penstemon albomarginatus*** **(white-margined beardtongue)** is a federally-listed Species of Concern and is a BLM Nevada Special Status Species - designated Sensitive by State Office. It occurs in sandy washes in creosote bush scrub habitat between 800 and 2,200 ft amsl. Distinguishing characteristics include the pinkish floral tube and white margin on the leaves. Approximately 500 plants were observed during pedestrian surveys (conducted in Spring 2001) for the Reliant Energy Bighorn Generation Facility project. Additionally, approximately 100 plants were found along County Road 31N, near Sheep Mountain; about 200 plants were found along Transmission Line Segment 50, between the UPRR and Sheep Mountain; and about 200 plants were found near Segment 25, east of Roach Lake (numbers approximate).
- ***Penstemon bicolor*** **ssp.** ***bicolor*** (yellow twotone beardtongue) is a federally-listed Species of Concern and a BLM Nevada Special Status Species - designated Sensitive by the State Office. It occurs on calcareous or carbonate soils in washes, roadsides, rock crevices, outcrops, or similar places receiving enhanced runoff, at 2,500 to 5,480 ft amsl. Distinguishing characteristics include a cream-colored floral tube and tall (3-foot high) stalk.
- ***Penstemon bicolor roseus*** **ssp.** ***bicolor*** **(rosy twotone beardtongue)** is a federally- listed Species of Concern. It occurs in habitats that closely resemble those of the yellow twotone beardtongue. Characteristics include the pink floral tube and tall stalk (2 to 3 feet). During the Reliant Energy project field surveys (2001), the observed distribution of rosy twotone beardtongue was essentially congruent with that of yellow twotone beardtongue.

Cactaceae and *Agavaceae*

State law under NRS 527.060-527.120 regulates any cactus, evergreen tree, or member of the genera *Yucca* or *Agave*.

The State of Nevada regulates the commercial harvest and transportation of cacti, evergreen trees, and members of the genus *Yucca.* The BLM Las Vegas Field Office requires that cacti and yucca be salvaged on public lands (Refer to BLM Stipulations provided in Appendix E).

Field Survey Results

Based on results of rare plant surveys, yellow two-tone beardtongue (*Penstemon bicolor* ssp. *bicolor*), rosy two-tone beardtongue (*P. bicolor* ssp. *roseus*), and white-margined beardtongue (*P. albomarginatus*) potentially are present within the project area. The subspecies and *P. albomarginatus* have been found in the project area. However, these plants were not able to be positively identified during the April - May 2002 visits due to the lack of flowering of most penstemons in the area and because their leaves are quite similar to the more common Palmer's penstemon. However, given that *Penstemon bicolor bicolor, P. bicolor* ssp. *Roseus,* and *P. albomarginatus* have been found in the area previously, the seed source would be present within the habitat.

Other rare plant species listed by the NNHP as occurring at similar elevations in southern Clark County were also searched for during these rare plant surveys. These plants included: Blue Diamond cholla (*Opuntia whipplei* var. *multigeniculata*), Las Vegas bearpoppy (*Arctomecon californica*), white bearpoppy (*Arctomecon merriamii*), black woollypod (*Astragalus funereus*), half-ring milkvetch (*Astragalus mohavensis* var. *hemigyrus*), Pahrump Valley buckwheat (*Eriogonum bifurcatum*), and others. None were located during the surveys. Locations of *Penstemon* sp. are identified in Table 4-3.

Table 4-3 Locations of *Penstemon* sp. (Potential two-tone beardtongue locations, 2002 Field Surveys)

Location (Using NAD27)	Segment Number/Road	Comments
642942E, 3964079N	IEC Plant Site Access Road From Highway 161	~20-30 plants in wash and along road at wash
642912E, 3964153N	IEC Plant Site Access Road From Highway 161	Couple plants in wash on W. side of road
642919E, 3964117N	IEC Plant Site Access Road From Highway 161	Couple plants in wash on W. side of road
642999E, 3863909N	IEC Plant Site Access Road From Highway 161	Several plants in wash
642990E, 3863956N	IEC Plant Site Access Road From Highway 161	Several plants in wash
643138E, 3964787N to 643157E, 3964892N	IEC Plant Site Access Road From Highway 161	Several plants in wide wash and roadside
643211E, 3961316N	Vicinity of Plant Site Access Option 3 road	Few plants in wash
640373E, 3964455N	Segment 10	Few plants along road
647787E, 3959236N	Access road from Hwy 161	Couple plants along road
647094E, 3959106N	Access road from Hwy 161	Couple plans along road near wash
648417E, 3959319N	Access road from Hwy 161	Several plants in wash
648008E, 3959251N	Access road from Hwy 161	Couple plants in wash
647800E, 3959230N	Access road from Hwy 161	Several plants along road
647442E, 3959197N	Access road from Hwy 161	Couple plants in wash
647152E, 3959114N	Access road from Hwy 161	Few in wash ~ 30 ft. downstream of road
646972E, 3959065N	Access road from Hwy 161	Several plants along road and in wash
647992E, 3959247N	Access road from Hwy 161	Couple plants along road
649938E, 3959795N	Access road from Hwy 161	Several plants in wash
646121E, 3958328N	Segment 30	A few plants in wash
645738E, 3958626N	Segment 30	A few plants in wash
645493E, 3958813N	Segment 30	A few plants in wash
663554E, 3958193N	Segment 60	A few plants in wash; prob. outside of project area
664096E, 3958520N	Segment 60	A few plants in wash; prob. outside of project area

Location (Using NAD27)	Segment Number/Road	Comments
664957E, 3958829N	Segment 60	Several plants in wash; prob. outside of project area
From 666136E, 3958491N To 671013E, 3958847N	Segment 60	A continuous population along a large braided wash and along an adjacent road
668470E, 3956599N	Segment 70	Several plants in wash; probably outside project area
666808E, 3956359N	Segment 70	Several plants along road
665488E, 3956039N	Segment 70	Several plants along road in McCullough Pass area

4.3.3 Noxious Weeds

"Noxious weed" is defined as any species of plant that is, or is likely to be, detrimental or destructive and difficult to control or eradicate (NRS *555.010-555.220).* Noxious weeds have become a growing concern in the United States and in southern Nevada because they can increase in cover relative to surrounding vegetation and exclude native plants from an area. The spread of noxious weeds has resulted in substantial economic impacts on some sectors of the State. Recognizing these impacts, the BLM established a goal that NEPA documents consider and analyze potential for weed spread and preventative rehabilitation measures for each management action involving surface disturbance. Mitigation measures that would be available for the proposed project, or its alternatives, are described in Section 5.1.3 and Section 5.2.3.

Table 4-4 presents a list of noxious weeds that occur in Nevada, some of which may occur in the project area.

Table 4-4 Noxious Weed Species Potentially Occurring in the Ivanpah Energy Center Project Area

Common Name	Scientific Name
Russian knapweed	*Acroptilon repens*
Camel thorn	*Alhagi camelorum*
Mayweed chamomile	*Anthemis cotula*
Whitetop or Hoary cress	*Cardaria draba*
Musk thistle	*Carduus nutans*
Canada thistle	*Cirsium arvense*
Diffuse knapweed	*Centaurea diffusa*
Iberian star	*Centaurea iberica*
Spotted knapweed	*Centaurea maculata*
Yellow star-thistle	*Centaurea solstitialis*
Squarrose knapweed	*Centaurea virgata var. squarrosa*
Rush skeletonweed	*Chondrilla juncea*
Water hemlock	*Cicuta maculata*
Purple star thistle	*Centaurea calcitrapa*
Poison hemlock	*Conium maculatum*
Common crupina	*Crupina vulgaris*
Houndstongue	*Cynoglossum officinale*
Leafy spurge	*Euphorbia esula*
Goat's rue	*Galega officinalis*
Hydrilla	*Hydrilla verticillata*
Black henbane	*Hyoscyamus niger*
Klamath weed	*Hypericum perforatum*
Dyer's woad	*Isatis tinctoria*
Perennial pepperweed (tall whitetop)	*Lepidium Iatifolium*
Tall whitetop	*Lepidium latifolium*
Dalmatian toadflax	*Linaria dalmatica*
Toadflax, yellow	*Linaria vulgaris*
Purple loosestrife	*Lythrum salicaria*
Eurasian water-milfoil	*Myriophyllum spicatum*
Scotch thistle	*Onopordum acanthium*
African rue	*Peganum harmala*
Sulfur cinquefoil	*Potentilla recta*
Austrian fieldcress	*Rorippa austriaca*
Mediterranean sage	*Salvia aethiopis*
Carolina horse-nettle	*Solanum carolinense*
White horse-nettle	*Solanum elaeagnifolium*
Sow thistle	*Sonchus arvensis*
Johnson grass	*Sorghum halepense*
Austrian peaweed	*Sphaerophysa salsula (= Swainsona salsula)*

Common Name	Scientific Name
Medusahead	*Taeniatherum caput-medusae*
Saltcedar (tamarisk)	*Tamarix ramosissima*
Puncture vine	*Tribulus terrestris*

Source: State of Nevada Noxious Weed List (http:I/www.state.nv.uslnvnhp/noxious.htm)

4.3.4 Wildlife

Wildlife expected to occur within and surrounding the project area are consistent with species found among low, widely spaced shrubs, particularly within creosote bush scrub habitat, below 4,000 feet above mean sea level (amsl). Information on species present was gathered from existing environmental documentation for projects in the vicinity of this project area and through an assessment of the habitat characteristics found to the present within the project area.

Reptilian species include desert iguana (*Dipsosaurus dorsalis*), western whiptail (*Cnemidophorus tigris*), desert collared lizard (*Crotaphytus insularis*), long-nosed leopard lizard (*Gambelia wislizenii*), desert horned lizard (*Phyrnosoma platyrhinos*), desert spiny lizard (*Sceloporus magister*), sidewinder (*Crotalus cerastes*), ground snake (*Sonora semiannulata*), side-blotched lizard (*Uta stansburiana*), western chuckwalla (*Sauromalus obesus*), and desert tortoise *(Gopherus agassizii).*

Avian species that may occur in the area include red-tailed hawk *(Buteo jamaicensis),* golden eagle *(Aquila chrysaetos),* American kestrel *(Falco sparverius),* prairie falcon *(Falco mexicanus),* mourning dove *(Zenaida macroura),* greater roadrunner *(Geococcyx californianus),* burrowing owl *(Athene cunicularia hypugea),* common raven *(Corvus corax),* cactus wren *(Campylorhynchus brunneicapillus),* rock wren *(Salpinctes obsoletus),* loggerhead shrike *(Lanius ludovicianus),* black-throated sparrow *(Amphispiza bilineata),* sage sparrow *(Amphispiza belli),* and Gambel's quail *(Callipepla gambelli).*

Mammalian species that may be expected to occur in the area include desert cottontail *(Sylvilagus audubonii),* black-tailed jackrabbit *(Lepus calzjfornicus),* white-tailed antelope squirrel *(Ammospermophilus leucurus),* Botta's pocket gopher *(Thomomys bottae),* kangaroo rats *(Dipodomys* spp.), desert woodrat *(Neotoma lepida),* bobcat (*Lynx rufus*), antelope ground squirrel (*Ammospermophilus leucurus*), coyote *(Canis latrans),* mule deer *(Odocoileus hemionus),* and desert bighorn sheep (*Ovis canadensis nelsoni).*

BLM (1998) has identified habitat ranges for the following three species of concern: desert bighorn sheep (*Ovis canadensis nelsoni*), mule deer (*Odocoileus hemionus*), and upland game birds (pheasant, turkey, quail, and chukar). The proposed project, project alternatives, and associated components are not located in any of these identified habitat areas; however, desert bighorn sheep crucial habitat is located in the North McCullough Range and Wilderness Study Area.

Areas of Critical Environmental Concern (ACECs) have been established specifically for the management of desert tortoise within the Northeastern Mojave

and Eastern Mojave recovery units as identified in the *Tortoise Recovery Plan*. ACECs were established to manage a sufficient quality and quantity of desert tortoise habitat, which in combination with tortoise habitat on other Federal, State, and private land, will meet recovery plan criteria. Functional corridors of habitat between ACECs also are to be maintained to increase the chance of long-term persistence of desert tortoise populations within the recovery unit (BLM, 1998).

There have been two "nominations" for additional Areas of Critical Environmental Concern having to do with the desert tortoise:

a. Goodsprings Valley, nominated by the Nature Conservancy. The BLM evaluation is stated as follows: 'The portion of the area that is desert tortoise habitat meets the relevance and importance criteria and warrants special management attention in order to ensure the continued existence of the desert tortoise. However, this area was not designated as critical desert tortoise habitat, nor was it identified in the Tortoise Recovery Plan as a Recovery Area. Therefore it was not carried forward into the (BLM's) proposed RMP as an ACEC. The remainder of the area does not meet the relevance and importance criteria and therefore does not warrant special management attention." (BLM 1998, page K-8); and,

b. Las Vegas Valley south through Goodsprings and Ivanpah Valleys to the California border, nominated by BLM. The BLM evaluation is stated as follows: 'The area meets the relevance and importance criteria. However, the Endangered Species Act provides an adequate level of protection for the biological values of the area. This area was not designated as critical desert tortoise habitat. Ongoing and future development of the area makes long-term management for desert tortoise recovery unfeasible for this area" (BLM 1998, page K-48).

All elements of the proposed Ivanpah Energy Center are outside the Desert Tortoise Translocation Area except the southern access road, the water supply pipeline, and the transmission line.

Field Survey Results

Wildlife species that were observed in the project area during surveys conducted during May and June 2002 are listed in Table 4-5 and include 17 species of birds, 8 species of mammals, and 10 species of reptiles. Wildlife species were directly observed or were detected via their sign such as scat, tracks, or burrows. A potential prairie falcon aerie was observed on a cliff face north of Segment 60 (in the McCullough Range). Whitewash was noted at this site, but falcon or young were not observed. Field data are provided in Appendix C.

Table 4-5 Wildlife Species Directly Observed in the Project Area or Detected Via Signs Such as Scat, Tracks, or Burrows

Common Name	Scientific Name
REPTILES	
Desert tortoise	*Gopherus agassizii*
Western whiptail	*Cnemidophorus tigris*
Zebra-tailed lizard	*Callisaurus dracnoides*
Side-blotched lizard	*Uta stansburiana*
Desert collared lizard	*Crotaphytus insularis*
Long-nosed leopard lizard	*Gambelia wislizenii*
Chuckwalla *	*Sauromalus obesus*
Desert short-horned lizard	*Phrynosoma douglassi*
Desert horned lizard	*Phrynosoma platyrhinos*
Coachwhip	*Masticophis flagellum*
BIRDS	
American kestrel	*Falco sparverius*
Golden eagle	*Aquila chrysaetos*
Red-tailed hawk	*Buteo jamaicensis*
Common raven	*Corvus corax*
Mourning dove	*Zenaida macroura*
Greater roadrunner	*Geococcyz californianus*
Black-throated sparrow	*Amphispiza bilineata*
Yellow-rumped warbler	*Dendroica coronata*
Rock wren	*Salpinctes obsoletus*
Verdin	*Auriparus flaviceps*
Horned lark	*Eremophila alpestris*
Ash-throated flycatcher	*Myiarchus cinerascens*
Black-tailed gnatchcatcher	*Polioptila melanura*
Common poorwill	*Phalaenoptilus nuttallii*
Western tanager	*Piranga ludoviciana*
Broad-tailed hummingbird	*Selasphorus platycercus*
White-throated swift	*Aeronautes saxatalis*
MAMMALS	
Desert woodrat	*Neotoma lepida*
White-tailed antelope ground squirrel	*Ammospermophilus leucurus*
Kangaroo rat	*Dipodomys spp.*

Black-tailed jackrabbit	*Lepus californicus*
Desert cottontail	*Sylvilagus audubonii*
Kit fox *	*Vulpes velox*
Coyote	*Canis latrans*
Desert bighorn sheep	*Ovis canadensis nelsoni*

* Detected via sign such as scat, tracks, and/or burrows.

Migratory Birds

The Migratory Bird Treaty Act (MBTA) makes it unlawful to take, kill, or possess migratory birds. Most avian species are protected by the MBTA with the exception of a few species, typically those that are non-native, such as the starling. Potential adverse impacts to migratory birds could occur if project activities take place during the breeding season in spring and early summer. Alteration of habitat could result in the direct loss of bird nests, eggs, or young. If habitat alteration occurs late enough in the breeding season, individuals might not be able to re-nest, which would result in the loss of their reproductive output. This potential impact can be avoided by restricting habitat alteration (*e.g.*, blading) to winter or fall when birds are not breeding.

Threatened, Endangered, and Proposed Species

One federally listed threatened species, the desert tortoise (*Gopherus agassizii*), is known to occur in the project area. No federally listed endangered or proposed wildlife species are known to occur in the project area.

As defined by the Endangered Species Act of 1973 (ESA), a threatened species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. An endangered species is any species that is in danger of extinction throughout all or a significant portion of its range. Proposed species are those that are proposed in the Federal Register by the USFWS to be listed as threatened or endangered.

The Bureau of Land Management has designated areas that are considered to have low, medium, and high densities of desert tortoise (BLM, 1997). The area south of Jean and east of I-15, including the Eldorado Valley is considered to have low densities of desert tortoise and has been designated as Category C. Project elements within the Category C density area include the Primm Plant Site Alternative, all transmission line segments except Segments 10, 20, 30, and 40, the two water treatment plant sites, and all water lines that are east of the interstate. Although Category B density areas extend along the east and west sides of I-15 north of Jean, those that could be affected by project development extend west of I-15 to the southern desert tortoise fence, near Primm. Project elements within the Category B Density area include the Proposed Goodsprings Plant Site, the telecommunications line, north and south access roads, the portion of the water supply pipeline that is west of I-15, and transmission line Segments 10, 20, 30, and 40. The Desert Tortoise Translocation Area is entirely within the area that is designated as Category B. The natural gas metering station and natural gas pipeline that would serve the Primm Plant Site is

south of the southern limit of the Category B density area west of I-15. Additional information regarding Category B and Category C desert tortoise density areas is provided in Sections 5.1.3 and 5.2.3.

Desert tortoise crucial habitat has been designated within Eldorado Valley. Although the area is primarily south of Eldorado Dry Lake, approximately 21,000 linear feet of transmission line Segments 60/65, and 90 cross the designated area. Field investigations that were carried out during 2002 indicate desert tortoise density within the area that is crossed to be low.

Species of Concern

Species of Concern are taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking. Species designated as species of concern have no regulatory status. However, consideration in the planning process may assist in developing alternatives to avoid conflicts with their conservation. Therefore, the species of concern that could potentially occur in the project area are addressed in this document. The special status species that could occur in and near the project area are listed in Table 4-6 and discussed below.

Table 4-6 Special Status Wildlife Species Potentially Occurring in the Project Area

Scientific Name	Common Name	USFWS Status	BLM Status	State Status
Athene cunicularia hypugea	Burrowing owl	Species of Concern	Special Status	State Protected under NRS 501
Callipepla gambelli	Gambel's quail	None	None	None
Gopherus agassizii	Desert tortoise	Threatened	Threatened	State Protected under NRS 501
Heloderma suspectum cinctum	Banded gila monster	Species of Concern	Special Status	State Protected under NRS 501
Ovis canadensis nelsoni	Desert bighorn sheep	None	None	Big Game Species
Sauromalus obesus	Western chuckwalla	Species of Concern	Sensitive Species	None
Vulpes velox	Kit Fox	Species of Concern	Sensitive Species	State Protected under NRS 501

Burrowing Owl (*Athene cuniculeria*)

The burrowing owl is listed as a federal Species of Concern, a BLM Proposed Nevada Special Status Species, and is protected under the Migratory Bird Treaty Act (MBTA). The small ground-nesting owl is found in desert washes, alkali scrub, and desert riparian/riverine habitats. It also inhabits fields and grazing land, and cut banks along roads and washes (Ryser 1985). Burrowing owls nest in abandoned mammal burrows (*e.g.*, ground squirrel, badger, coyote, and kit fox), which they enlarge and excavate (Herron, *et al.* 1985).

They also use abandoned desert tortoise burrows. The species preys primarily on insects, but also eats small rodents, reptiles, and amphibians. Because they are active during both the day and night, burrowing owls are easy to observe (Haug, *et al.* 1993). Burrowing owls can be observed perched at or near their burrows during the day and forage in the morning and evening hours. During the hottest part of the day, they take cover in their nest.

Burrowing owls have a tendency to colonize in breeding colonies of up to 12 pairs. Courtship typically begins in April. A female lays an average of five to nine eggs, although a clutch might contain between four to eleven eggs. The eggs are incubated for approximately 21 days. By early June, use of burrows becomes increasingly obvious when the young become active near the burrow entrance. Insect parts, regurgitated pellets, and thrown-up dirt are typically present.

Suitable habitat for the burrowing owl is present in the project area. However, no burrowing owls or their sign (*e.g.*, burrows, scat, feathers) were observed. Additional surveys would be needed to determine if the species is present during the winter.

Gambel's Quail (*Callipepla gambelli*)

Gambel's quail inhabits desert scrub dominated by desert hackberry, mesquite, catclaw, buckhorn and cholla cactus; chaparral, and riparian habitat (USDA, 1991). Preferred roosting habitat is dense shrubs or low trees. Roost sites usually occur in close proximity to brushy escape cover and succulent vegetation. Seeds and leafy vegetation comprise most of the quail's diet, but some insects are consumed during the nesting season. Gambel's quail are non-migratory. The species forms large coveys from 20 to more than 100 birds. In February or March, pairs leave the covey and disperse to nest. Nests are scratched depressions on the ground. Annual movements of a covey encompass an area of less than one mile.

Potentially suitable habitat is present in the first three miles of Segment 10 in the westernmost portion of the project corridor. However, preferred habitat is not typically present in the project area and Gambel's quail were not observed during the field surveys.

Several crucial quail habitat areas are identified by the BLM RMP within Ivanpah Valley and the McCullough Range. An area within Ivanpah Valley is crossed by Segment 25 of the proposed transmission line corridor serving the Primm Plant Site. Crucial quail habitat also is crossed by transmission line Segment 60, through the McCullough Range. Approximately 13,000 linear feet of Segment 60 and approximately 13,000 linear feet of Segments 15 and 25 cross critical quail habitat. Although not observed during 2002 field investigations, it is likely that quail would be present in both locations during the nesting season and at other times.

Desert Tortoise (*Gopherus agassizii*)

Clark County, the BLM, National Park Service, U.S. Forest Service, and the U.S. Fish and Wildlife Service (USFWS) entered into an agreement to take actions to protect the Desert Tortoise. As part of the agreement, Clark County administers the Multiple Species Habitat Conservation Plan (MSHCP) and its Adaptive Management Program (AMP). The goals of the MSHCP are to develop and

implement programs (such as the AMP) which provides for the incidental "take" of federally-listed species on private land. The objectives of the program are to provide a balance in economic growth, while maintaining conservation of natural resources of the county. The AMP has been established to develop a science-based program to monitor the status of the species (including habitat and threats), monitor and evaluate the effectiveness of conservation and management actions, and provide recommendations as related to management practices.

Although only an element of the MSHCP, resource agencies established and maintain the 20,000-acre Desert Tortoise Trans-location Area which is located on BLM-managed land in western Ivanpah Valley. Approximately 700 healthy tortoises were initially released in March of 1997; more than 3,000 are currently believed to be within the area (Burroughs, 2002).

Conservation efforts in the area include limitations to development, requirements for mitigation measures for actions within the area, fencing to protect the species from vehicles, and monitoring of species viability. Furthermore, the area has been set aside to exclude recreational events and grazing that could result in wide-spread impacts to the species. Off-road racing events, such as those that take place on BLM land east of I-15, can result in direct loss of species individuals and habitat as a result of crushing and land disturbance. Grazing can adversely affect the species due to crushing of individuals and burrows and competition for food. Recreational vehicle use and livestock production also increases the potential for the introduction of noxious weeds and other undesirable plants that can displace native vegetation that is important to the species.

The desert tortoise resides within the Mojave Desert in the desert scrub habitat at elevations below 5,000 ft amsl. The species was federally listed as Threatened under the Endangered Species Act in 1990, and is also protected by Nevada state law. It is most commonly found on alluvial fans and sandy, gravelly washes, but also seeks shelter in rock dens at higher elevations.

The desert tortoise thermo-regulates by avoiding temperature extremes, remaining sequestered in a burrow during the hottest part of the day and season, and hibernating in winter. Courting and copulation may occur at any time that the tortoises are above ground. However, there seems to be more of this behavior in late summer and early fall when the testosterone levels peak in males. Females store sperm and egg laying occurs May, June, and July. The number of eggs varies. A mature female might lay four to eight white, hard-shelled eggs in a clutch and produce two or sometimes three clutches in a season. Nests are often dug near the burrow opening early in the season and farther inside, late in the season. Some nests are dug away from the burrow but usually under a shrub. Incubation periods of 90 to 120 days are typical. Temperatures inside the nest determine sex of individuals. Tortoises grow at varying rates depending upon food availability. The number of growth rings in a given year may be zero to several; hence, one cannot determine a tortoise's exact age by counting those rings. Sexual maturity is a function of size rather than age, approximately seven to eight inches mid-carapace length in females. Generally, desert tortoises don't reach sexual maturity for 15 to 20 years. Contributing factors to the status of this species include predation, pet collection, human encroachment, habitat destruction,

and a highly infectious disease known as Upper Respiratory Tract Disease (URTD).

Protection and conservation of the desert tortoise is administered under the *Tortoise Recovery Plan* and the Clark County Multi-Species Habitat Conservation Plan. A portion of the proposed transmission line west of I-15 passes through the Desert Tortoise Translocation Area. Tortoise habitat is of lower quality east of I-15 due primarily to the finer-grained, collapsible soils in the area. Similarly, neither the indurated alluvium of that portion west of I-15, or the fine-grained alluvium and disturbed habitat east of I-15 provide high quality desert tortoise habitat.

Field investigations were carried out to determine the presence of desert tortoise on the Goodsprings Plant Site, access roads, and potential transmission line corridors. Results of the investigations indicate that the species is relatively abundant (compared to other project area localities) along Transmission Line Segments 20 and 30 (across the mountain west of the proposed Goodsprings Plant Site and the corridor through the Translocation Area) and along the northern and southern access roads to the Goodsprings Plant Site. Densities along proposed transmission line corridors west of I-15 and within Eldorado Valley were considered to be low to very low. Additional information regarding species densities is provided in Section 5 (Environmental Consequences) and Appendix F (Draft Biological Assessment).

Banded Gila Monster *(Heloderma suspectum cinctum)*

The banded gila monster is listed as a federal Species of Concern and is protected under state law. The banded gila monster is one of only two species of venomous lizards, both of which are in the family Helodermatidae. The range of the banded gila monster encompasses the Mojave, Sonoran, and Chihuahuan deserts of extreme southwestern Utah, southern Nevada, southeastern California, western Arizona, and southwestern New Mexico into Mexico. It is found in desert and semiarid regions of gravelly and sandy soils with shrubs and is typically found under rocks, in burrows of other animals, and in holes it digs itself. It typically feeds on small mammals, birds, and eggs at night. They mate throughout the summer months, with the female laying three to five eggs in sandy soils, burrows, or under rocks, during fall or winter. Gila monsters spend most of their lives below the ground. Most of their above ground activity occurs for three months during the spring. Not only is this when mating occurs, but it is when their main source of food (vertebrate nests) is most abundant. They are diurnal with activity occurring mainly in the morning. This species was not observed in the project area. The project area is within the known range of the banded gila monster and the species presence has previously been reported to Nevada Division of Wildlife (NDOW).

Desert Bighorn Sheep (*Ovis canadensis nelsoni*)

The desert bighorn sheep is a managed big game species by the NDOW. Desert bighorn sheep were observed in the McCullough Range on two occasions. The observed animals consisted of three rams, nine ewes; and five rams, twenty-one ewes, and three lambs. In both cases, the sheep were observed north of Segment 60, adjacent to the existing transmission line road.

Western chuckwalla (*Sauromalus obesus*)

The western chuckwalla is a federal Species of Concern and a BLM Nevada Special Status Species. Their range covers east-central California, southern Nevada, southwestern Utah, western Arizona, and northeastern Baja California. In Clark County, Nevada, the chuckwalla occurs in virtually all the rocky hillsides up to elevations of 4,500 ft amsl. They inhabit desert regions with rocky outcroppings where boulders and fractured rocks provide shelter. Chuckwallas feed on leaves of shrubs, annual and perennial flowers, particularly globe mallow. Chuckwallas are shy and, if approached, will hide in the cracks and crevices of nearby boulders. If the threat persists, they can wedge themselves tightly in the crevice by inflating their lungs up to three times the normal breathing capacity. This makes it almost impossible for a predator to drag them out. Mating occurs between April and July, with a clutch of as many as 16 eggs laid between June and August. The eggs hatch in the late warm season. Chuckwalla were detected via sign (*i.e.*, scat) in the following three locations in the project area: Crystal Pass area (Segment 10), southeast of Crystal Pass (middle section Segment 20), and in the McCullough Range (Segment 60). Suitable habitat is not present in other portions of the project area.

Desert Kit Fox (*Vulpes velox*)

The desert kit fox is considered a sensitive species by the BLM and a furbearing species by the Nevada Department of Wildlife (NDOW). Kit fox burrows were noted throughout the project area and their locations were recorded with the GPS units. Burrows in the vicinity of Segment 130 had evidence of previous use as natal dens. Few burrows showed signs of recent use. Current sign (*e.g.*, tracks) was noted only at burrows in Segment 130.

Bats

Several species of bats could occur in the general vicinity of the project area and are discussed below. No surveys for bats using mist nests or ultrasonic bat detectors were conducted in or near the project area. However, a bat (species unknown) was observed flying on 3 May in the vicinity of Segment 20 and Segment 10.

Potential roost sites such as rock outcrops (*e.g.*, Crystal Pass (Segment 10), McCullough Range (Segment 60), and mapped and unmapped mine features (*e.g.*, adits), are located in the project area. The mine adits are situated in the westernmost portion of the project area in the vicinity of Segment 10. Lighting was inadequate to determine whether guano was present in the adits.

Figure 4-3 shows vegetation and wildlife resources that could be affected by the proposed project.

4.4 CULTURAL RESOURCES

4.4.1 Prehistoric

Exactly when people first entered the region is unknown but most researchers agree that Paleoindian peoples were occupying the Great Basin area circa 12,000 to 10,500 B.P. The Paleoindian Period adaptation has been characterized as a relatively mobile hunting and gathering lifestyle, with small groups of people utilizing sites for a short period of time. The Paleoindian period in North America is characterized by fluted projectile points and associated with hunting of now-extinct Pleistocene mega-fauna.

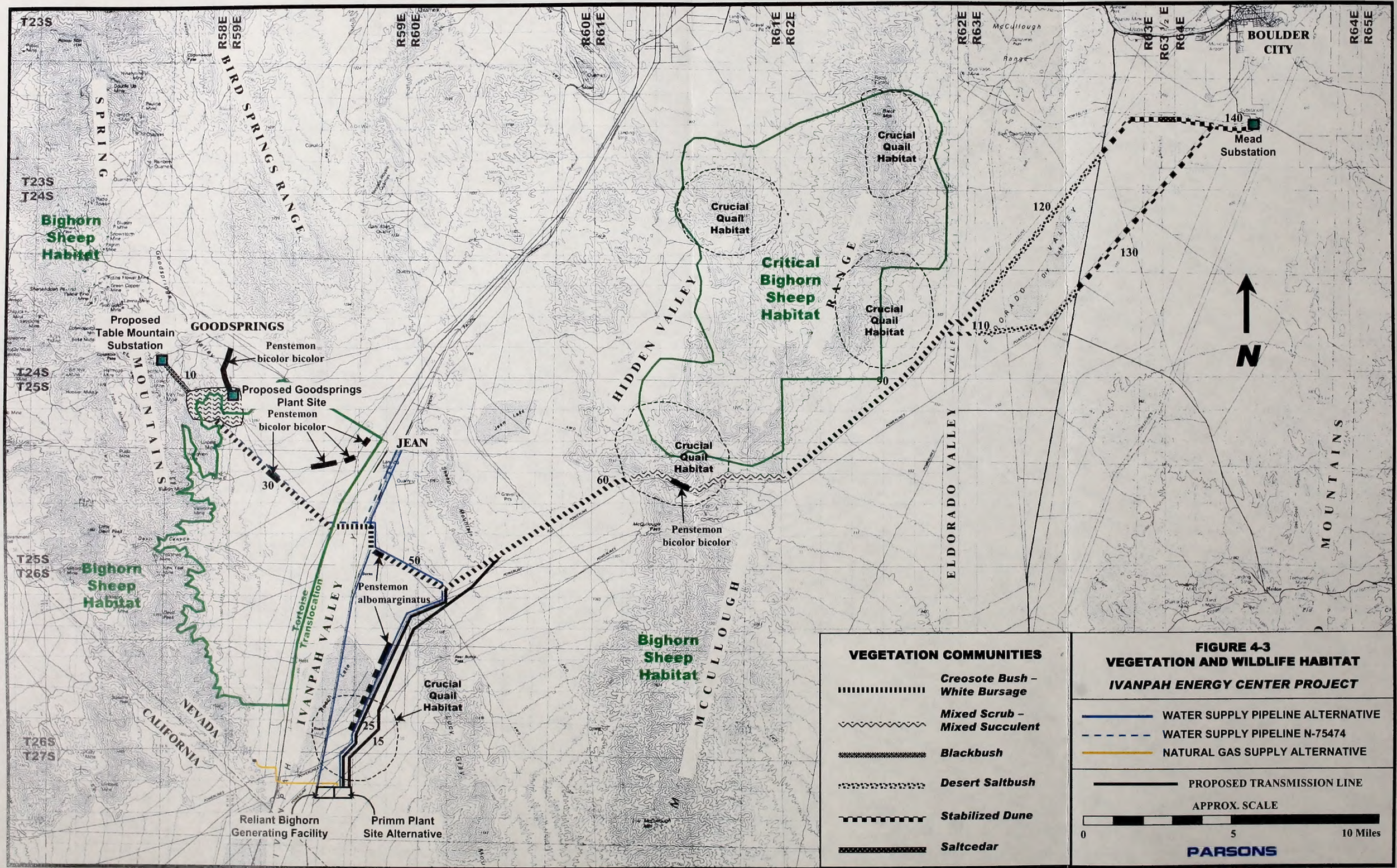


FIGURE 4-3
VEGETATION AND WILDLIFE HABITAT
IVANPAH ENERGY CENTER PROJECT

Within the proposed APE, the Paleoindian Period includes the Lake Mojave Period (12,000 – 7,000 B.P.). Evidence of Paleoindian occupation is scant in southern Nevada and is generally limited to isolated projectile points. However, Tule Springs, located along Las Vegas Wash is an excellent example of Paleoindian occupation. Initially investigated in the 1930s, Tule Springs was also studied by the Southwestern Museum of Los Angeles in the 1950s (Harrington 1930; Harrington and Simpson 1961; Shutler 1967). Radiocarbon dating from the site suggests an occupation from 10,000 B.P. to 12,000 B.P.

The term "Archaic" applies to a variety of peoples who practiced a nomadic, hunting-gathering economy and inhabited the Great Basin from circa 10,500 B.P. to when Euroamerican explorers and settlers entered Nevada in the early 1800s. The megafauna prevalent during the Paleoindian era had become extinct and the climate became warmer and drier. Archaic groups likely adapted their subsistence practices to the environmental conditions of specific locals and territories through which they ranged (Elston 1982, 1986; Jennings 1986; O'Connell *et al.* 1982). In the Great Basin area, the Archaic subsistence strategy was characterized by hunting, trapping and snaring of birds, insects, deer, antelope, mountain sheep, rabbits, and other small animals; as well as the collecting of grasses, seeds, bulbs, nuts, roots, berries and other plants.

The material cultural of these Archaic people was more complex than the Paleoindian and included flat milling stones, basketry, smaller lanceolate or triangular projectile points (Pinto, Elko series, Humboldt, Gypsum and Gatecliff Split-stem projectile points) netting, fur cloth, fiber sandals or hide moccasins, atlatls, hardwood dart shafts, digging sticks, curved wooden clubs, serrated scapula saws, bone awls, and imported marine shells from the California coast (Jennings 1957, 1964, 1966). Some researchers previously suggested that southern Nevada was largely unoccupied during this time (Hauck *et al.* 1979; Rafferty 1984; Shutler 1967; and Warren and Crabtree 1972). Within the current APE, the Archaic has been further subdivided into the Pinto Period and the Gypsum Period.

Cultural chronologies for the Las Vegas Valley are shown on Table 4-7.

Over portions of the Great Basin and surrounding regions during the latter portion of the first millennium A.D., populations developed horticulture and shifted to more sedentary lifeways. Within the southern Great Basin, Fowler and Madsen (1986:175-181), Lyneis *et al.* (1978:178-179), and Warren and Crabtree (1986:191) have provided evidence of agricultural societies. Termed the Virgin Branch Anasazi, these peoples were concentrated along the fertile valleys of the Muddy and lower Virgin Rivers in southeastern Nevada and the adjacent portions of Utah and Arizona. The sites of the Saratoga Springs Period appear to exhibit cultural continuity with the Gypsum Period. Change is most apparent in the size of projectile points, introduction of ceramics and horticultural implements, permanent architecture, extensive storage facilities, and grinding implements suitable for processing large quantities of grain. The Saratoga Springs Period has been further subdivided into four phases: Moapa; Muddy River; Lost City; and Mesa House (Shutler 1961; Ezzo 1995:46; Kelly *et al.* 1990).

The Patayan culture group is also believed to have periodically visited southern Nevada. The Patayan coincide with the emergence of a ceramic technology and the beginning of an agriculturally based subsistence strategy practiced the length of the lower Colorado River. The term Patayan culture incorporates groups previously called "Yuman" and encompasses peoples in the lower Colorado River drainage and the Sonoran Desert, Mojave Desert, and northern Baja California. Patayan sites are primarily characterized by rock-lined jacal structures, rock-filled roasting pits, and simple dry-masonry structures (Schroeder 1975, 1979). Cultural features also associated with the Patayan include areas where desert pavement has been removed to create shapes and figures called "intaglios," "earth figures," or "geoglyphs" (Ezzo *et al.* 1995:64). Based on changes in ceramic styles, settlement patterns, and the presence of trade wares, the Patayan Tradition has been divided into three phases: Patayan I (A.D. 500-1050); Patayan II (A.S. 1050-1500), and Patayan III (A.D. 1500-present).

There has been much debate in the scientific community regarding when the Numic-speaking people migrated into the Great Basin area. It is generally thought that these people entered the Great Basin between 1,000 and 5,000 years ago (Madsen and Rhode, 1995). Chronological markers in the southern Great Basin include Brownware pottery (Bettinger and Baumhoff, 1982; Madsen, 1975:83; Thomas and Bettinger, 1976) and Desert Side-notched projectile points (Fowler and Madsen, 1986:181-182; Warren and Crabtree, 1986:191-192). By around 1300 A.D., these people, repre-senting a subgroup of the Uto-Aztecan linguistic group, included those who later came to be known as the Utes, Paiutes, and Shoshones. They eventually expanded across Nevada and into present-day Utah (Janetski, 1994). Prior to the adoption of the horse, these three groups were culturally similar, primarily subsisting on plant gathering, seeds, small game, and insects. Linguistically, the Utes and Paiutes spoke mutually intelligible dialects of the same language base. The Shoshones, on the other hand, spoke a language that was not understood by either the Utes or Paiutes (Steward, 1974). With the acquisition of the horse, some of the Ute, Shoshone, and Northern Paiute bands began adopting cultural traits of the Plains people, such as buffalo-hunting and tepees.

The bands that did not adopt the horse still lived by hunting small game.

4.4.2 Historic

By the late 1700s Spain had established large commercial colonies throughout what is now the New Mexico and southern California regions. The desire to link the two areas without having to negotiate the Grand Canyon resulted in the expeditions of Fathers Francisco Dominguez, Silvester Velez de Escalante, and Father Garces in 1776 (Swanson, 1995). Portions of the route followed by the Dominguez and Escalante expedition were incorporated into the Old Spanish Trail.

The first Euroamerican trappers and traders to enter present-day Nevada were Jedediah Smith and Peter Skene Ogden (Brooks, *et al.,* 1977; Cline, 1963; Thomas, *et al.,* 1986). Neither of these men's reports contained much description of the indigenous people they encountered. These early expeditions reported that fur trapping in the area was very limited. In the early 1830s, before the last of the trappers left and the first official exploration of what is now Nevada began, Antonio Armijo, a Santa Fe trader, headed a commercial caravan following the Old Spanish Trail. The train ran through the Las Vegas Valley to the Pacific Coast. Fehner and Gosling (2000:7) suggest that "the Old Spanish Trail" served a primary means of reaching the Pacific Coast until the termination of the war with Mexico in 1848. The trail became a major component of the trade network between the West Coast and the interior of the country. In 1844, Capt. John C. Fremont led an expedition of the U.S. Corps of Topographical Engineers through southern Nevada to explore and map the vast unknown spaces of the west.

Members of the Church of Jesus Christ of Latter-day Saints (Mormons) were the first Euroamericans to settle in southern Nevada. The Mormon pioneers arrived in the Salt Lake Valley of Utah in July of 1847. During their journey, the Mormons were intercepted by Col. Stephen W. Kearny, who enlisted a group of 500 men and two women to assist with the nation's efforts in the recently declared Mexican-American War (Swanson, 1995:79). Dubbed the Mormon Battalion, they arrived in San Diego in late January 1847 after hostilities between the two nations had ceased. Following their discharge from service in 1848, most of the battalion members traveled to northern Utah. The route they followed included sections of the Old Spanish Trail from Los Angeles, through the Las Vegas Valley, to the headwaters of the Virgin River. From there, they followed a northerly route through Utah to the Salt Lake Valley (Smart, 1994:546). This corridor, including the portion of the Old Spanish Trail, became commonly referred to as the Mormon Trail.

Originally part of Mexico, the present state of Nevada became part of the United States with the signing of the Treaty of Guadalupe Hidalgo in 1848. Brigham Young, leader of the Church of Latter Day Saints (Mormons) claimed the present state of Nevada as part of his "State of Deseret" which he hoped would eventually be admitted to the Union (Hulse, 1991:51). In 1851, he sent a group of nearly 500 church members to establish a community in San Bernardino (Swanson, 1995:80). The success of the San Bernardino colony and the substantial traffic along the Mormon Trail prompted Young to establish a settlement halfway between San Bernardino and Salt Lake City. The new settlement, Las Vegas, was founded in

Table 4-7 Cultural Chronologies for the Las Vegas Valley (Ezzo *et al.* 1995)

Years B.P	Shutler 1976	Hauck *et al.* 1979	Rafferty 1984	Warren & Crabtree 1986	Kelly *et al.* 1990	Ezzo 1995
200		Protohistoric	Paiute	Shoshonean	Protohistoric	Protohistoric
500						Late Prehistoric
800	Mesa House	Mesa House		Saratoga Springs: Mesa House	Saratoga Springs: Mesa House	Saratoga Springs: Mesa House
1,100	Lost City	Lost City	Puebloan	Saratoga Springs: Lost City	Saratoga Springs: Lost City	Saratoga Springs: Lost City
1,400	Muddy River	Muddy River		Saratoga Springs: Muddy River	Saratoga Springs: Muddy River	Saratoga Springs: Muddy River
1,700	Moapa	Moapa		Saratoga Springs: Moapa	Saratoga Springs: Moapa	Saratoga Springs: Moapa
2,000		Little Lake		Gypsum	Gypsum	
3,000	Pinto-Gypsum	Pinto-Gypsum	Pinto-Gypsum			Gypsum
4,000	Corn Creek Dune			Pinto	Pinto	
5,000						
6,000	Hiatus	Hiatus	Hiatus			Pinto
7,000						
8,000		"San Dieguito"	Lake Mojave	Lake Mojave	Lake Mojave	Lake Mohave
9,000						
10,000	Las Vegas	Tule Springs	Tule Springs			
11,000	Tule Springs					
12,000						
13,000						

1855 by 30 members of the church (Hulse 1990:73-77; Rowley, 1989:1-3 & 1-4). In 1857, Young recalled the settlers and dissolved the settlement (Swanson, 1995:83). From 1865 to 1875 the land around the former Mormon Mission came under the ownership of several ranchers and farmers including, Albert Knapp, Octavius Gass, Archibald Stewart, and later Conrad Kiel (or Kyle) (Swanson, 1995:88-91). Agriculture became the economic foundation of the Las Vegas Valley as large farms, with irrigated fields and large ranches housing substantial numbers of livestock, dominated the area.

The Nevada Territory was created in 1861 following the discovery of the gold and silver at Virginia City in 1859. Statehood was expedited because the Comstock silver was used to help finance the Union cause during the Civil War. The Nevada Territory became a state in 1864 (Pendelton, *et al.*, 1982).

Prior to 1900, the Union Pacific Railroad (UPRR) had surveyed and laid claim to a possible railroad corridor between Salt Lake City and Los Angeles, essentially following the route of the Mormon Trail (Hulse, 1990:205). In 1901, William A. Clark formed the San Pedro, Los Angeles & Salt Lake City Railroad Company (SP, LA & SL), with the goal of constructing a rail line along the UPRR's previously surveyed route (Swanson, 1995:92-93). By 1903, the SP, LA & SL had merged with the Oregon Short Line Company, a subsidiary of the UPRR and competitor, to construct the line. In 1904, the line reached Las Vegas and it was completed by January of 1905.

Southeastern Nevada, and particularly Las Vegas, thrived during the 1920s primarily due to the federal government's proposal to construct a large dam as part of the new Colorado River Compact. During the Great Depression the Boulder/Hoover dam project required so many workers that Las Vegas became known throughout the west as the only place to get a job (Blair, *et al.*, 1999:41). Construction associated with the dam began in early 1931, with work on the railroad spur between Las Vegas and the dam site (Swanson, 1995:107). The dam began impounding water in 1935, and all of the major transmission lines were completed by the close of the 1930s. During the 1930s Nevada ranked first in total per capital debt relief expenditures, loans, Civilian Conservation Corps (CCC), Civilian Works Administration (CWA) and Works Progress Administration (WPA) funds as well as in funding for public roads (Elliott, 1987:297). The CCC employed nearly 4,000 people throughout the state and operated 24 main camps, including several in Las Vegas and the surrounding area (Elliott, 1987:297; CCC 1934 to 1942).

The unemployment rise after by the completion of Hoover Dam was counteracted with the Unites States entry into World War II. The United States Air Force opened an aerial gunnery school in Las Vegas in 1941 and Basic Magnesium, Inc., the world's largest magnesium plant was opened in what would become the town of Henderson (Jones and Cahlan, 1975:97-99). The end of World War II began a new era of military involvement in Nevada. The Nevada Test Site was opened in January 1951 and served as the location for several above ground nuclear tests. In 1963, testing moved underground after President John F. Kennedy signed the Limited Test Ban Treaty with the Soviet Union (Undall, 1994:239).

The area's economy has shifted from a focus on industry and agriculture to one dominated by tourism. As the casinos, and their accompanying attractions became more spectacular, Las Vegas grew in popularity as a tourist and convention destination. By 1990, the city was welcoming 1.5 million convention-attendee each year (O'Connor, 1994:561). In 1998, over 30 million people visited Las Vegas (Las Vegas Leisure Guide, 2002).

4.4.3 Ethnographic

The aboriginal territories of the Southern Paiute extended across southern Utah, Nevada, northern Arizona, and down along the western side of the Colorado River to present-day Blythe, California. Kelly and Fowler (1986) listed at least 16 Southern Paiute groups, or bands, which each had their own territories within these lands. Martineau (1992) recorded the names of 29 bands, many of which no longer exist. Surviving members of these bands now reside off-reservation, as well as on small reservations and other tribal lands throughout Utah, Arizona, California, and Nevada.

The Las Vegas, or *Tuh'du Ningwoo* (desert people), lived in a relatively large region bounded on the east by the Mojave desert and Amargosa River in California and on the west by the Colorado River. Like other Numic tribes, the Southern Paiute were hunters and gatherers and generally migrated on a seasonal basis within particular band territories. These annual cycles differed among bands based on environmental conditions. Some Southern Paiute bands chose to live in caves; others lived in conical brush shelters called wickiups. In the summer, many Southern Paiute families lived among the trees under brush shades (Kelly and Fowler, 1986). The favored semi-permanent campsites were at the bases of scarps or lower slopes near water sources and juniper stands (Kelly, 1964).

Southern Paiute house-types consisted of the wickiup, a dome-shaped structure made of posts and covered with grass and bark; a circular enclosure made of brush (*nuvipi*), and a rectangular shade consisting of a flat roof on posts (*avagan*). They also constructed sweat lodges (*nasa-kan*) that were smaller versions of the wickiup (Kelly, 1964, 1976).

The Southern Paiute were hunters and gatherers; however, a few of the bands did practice a small amount of horticulture. In this respect, the Southern Paiute differed from the Ute and Shoshone (Steward, 1938).

Plant gathering methods employed by the Southern Paiute were primarily the same as those used by other Numic people. Seeds, mostly from grasses, were gathered using a seed beater, parched using a flat parching tray, and stored in a conical container. Berries, including buffalo berries, choke cherries, currants, elder berries, gooseberries, raspberries, serviceberries, squaw berries, and strawberries, were either eaten fresh or dried and stored in a buckskin bag. Roots, like the sego root, were collected with a digging stick. Other plants utilized for food by the Southern Paiute include pine nuts, some cacti, yucca fruit, cattail, tule, and mescal (Kelly 1964, 1976; Kelly and Fowler 1986).

Hunting methods used by the Southern Paiute were similar to those of other Numic people, but were adapted to meet environmental conditions. They held organized drives to capture and kill rabbits and antelope. Antelope drives did not

appear to be shamanistic and were not held often (Kelly, 1976). Mountain sheep were sometimes hunted by parties who ran the sheep into a cleft in a canyon or onto a promontory. The hunters used fire to drive the sheep. Occasionally, they would run the mountain sheep off a bluff. Other animals hunted for food included deer, bears, mountain lions, young coyotes, foxes, wildcats, porcupines, beavers, marmots, badgers, ground hogs, rock squirrels, prairie dogs, squirrels, chipmunks, wood rats, mice, gophers, ducks, flickers, mourning doves, sage hens, wild turkeys, quail, owls, and eagles. Also eaten were bird eggs, fish, lizards, snakes, locusts, ant larvae, and caterpillars (Kelly, 1976; Kelly and Fowler, 1986).

Primary sources that contain more detailed information concerning Southern Paiute culture and history include research conducted by Drucker (1937, 1941); Stewart (1942); Kelly (1934, 1939, 1964); Euler (1964, 1966, 1972); Fowler, Euler, and Fowler (1969); the Inter-Tribal Council of Nevada (1976); Turner and Euler (1983); and Bunte and Franklin (1987).

4.4.4 Results of the Class I Cultural Resource Inventory

The primary research objective of the Ivanpah Energy Center, Cultural Resource Inventory is to collect site-specific data sufficient for the Ivanpah Energy Center L.P. to utilize in project planning. A Class I records search was conducted by SWCA and Harry Reid Center personnel in April and May 2002 (Kelly and Jones, 2002).

A total of 74 cultural resource inventories have been conducted within 1 mile of the proposed APE (Table 4-8). These inventories resulted in the recordation of 115 archeological sites. Of these 115 sites, four are located within the APE, two of which are considered eligible to the National Register of Historic Places (NRHP). Several additional ineligible sites are noted to occur immediately adjacent to the APE. A total of 16 sites were recorded as "isolated artifacts" but given state site numbers. The remaining 99 archaeological sites include 62 prehistoric, 34 historic, and three multi-components.

Table 4-8 Cultural Resource Inventories Conducted Within One Mile of the Current Proposed APE.

Report Number	Author	Report Title
5-2416(P)	Roberts, *et al.* 2002	Archaeological Survey for the Table Mountain Wind Generation Project Clark County, Nevada
5-1464(N)	Zale, 1985	BLM Class III Cultural Resource Inventory Report
5-2108(P)	Talbot, *et al.* 1991	A Cultural Resource Inventory of the Proposed Wycal Pipeline Through Southern Nevada
5-150-14(1); 5-2411	Blair, *et al.* 2001	Cultural Resource Class I and Class III Investigations for the Proposed 2003 Kern River Expansion Project
5-1985(P)	Dubarton and Edwards, 1991	Kern River Gas Transmission Line Supplemental Report Number 6. Survey of the Southwest Gas Metering Station
5-47(N)	Foley, 1974	BLM Antiquities Site Inventory
5-1979 & 5-1963	Davis, 1990	Temporary Use Application Environ-mental Supplement: Biology and Archaeology Survey Results for the Proposed Goodsprings Compressor Station Site
5-2342(N)	Rolf, 1996	Cultural Resources Inventory Negative Report
5-1948(P); 5-2108	Talbot, *et al.* 1989	A Class I Overview of the Proposed Wycal Pipeline Corridor Through Utah and Nevada
5-1043(P)	Rafferty, 1982	BLM Cultural Resources Format/Field Worksheet
5-25-10	Green, 1980	A Cultural Resource Investigation of the Southern Section of Seismic Line #10 in Ivanpah and Jean Lake Valleys, Clark County, Nevada
5-2248(P)	Petersen, 1994	Cultural Resources Report On the Proposed Valley Electric Association Powerline From Boulder City to Pahrump, Clark and Nye Counties, Nevada
5-107(N)	Williams, 1975	BLM Cultural Resource Report
5-1737(P)	Cleland, *et al.* 1987	Kern River Pipeline Cultural Resource Overview
NDOT 063-82R/ 5-1108(P)	Knight and Leavitt, 1982	SR 161 Safety and Improvement Project
5-1480(N)/ 5-71-5	Rafferty, 1985	A Cultural Resource Investigation of a Power Line Right-Of-Way Near Goodsprings, Clark County, Nevada

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Report Number	Author	Report Title
5-2261(N)	Rolf	BLM Cultural Resources Inventory Negative Report
5-2148(P)	Dames and Moore, 1991	Final Cultural Resource Survey Report: Goodsprings Compressor Station Utility Corridor For the Central Telephone Company and the Nevada Power Company
5-861(P)	Recorded by Leavitt, 1980	NDOT Cultural Resources Report
NDOT 012-85R; 5-1476	Recorded by Knight and Leavitt, 1985	NDOT Cultural Resources Report
5-2138	Matranga, 1991	Archaeological Testing of 26Ck4043, Clark County, Nevada
5-25-7; 5-643	Heid, 1980	A Cultural Resource Investigation of Seismic Line #9, Ivanpah Valley, Nevada and California
5-1725(P)	Stornetta, 1987	Cultural Resource Inventory and Evaluation for Williams Telecom-munication Company=s Fiber Optic Cable Right-of-Way: Nevada-Utah State Line to California-Nevada State Line
5-1916(P)	Peak & Associates, 1988	Summary of the Woodward-Clyde Consultants 1988 and the Dames and Moore 1987 Cultural Resource Reports for the Williams Telecommunication and Sprint Fiber Optic Cable Lines in Clark County, Nevada
5-75(N)	Williams, 1975	Cultural Resources Survey for the Proposed Jean State Prison Site, R. & P. P. Application # N-11732
NDOT 010-80P	Moore and Leavitt, 1979	NDOT Cultural Resources Report
5-2284	Myhrer, 1994	Inventory for Jean Airport Land/Lease, Clark County, Nevada
5-259(N)	Williams, 1977	N5-77-12 So. Nev. Jackrabbits Desert Race
5-1304(P)	Tucker, 1983	Results of Cultural Resources Investigations of the Access Roads Outside the Right-of-Way for the Ivanpah and Kingston Divisions of the Intermountain Power Project (IPP) Intermountain-Adelanto Line 1 in Nevada
5-191(N)	Williams, 1976	Taco Bell Beaners European Scrambles Desert Motorcycle Race, N5-76-19
5-514(P)	Dames & Moore, 1985	Mead/McCullough-Victorville/ Adelanto Transmission Project Technical Report. Volume IV Cultural Resources

Report Number	Author	Report Title
5-904(P)	Barker, *et al.* 1979	An Archaeological Sampling of the Proposed Allen-Warner Valley Energy System, Western Transmission Line Corridors, Mojave Desert, Los Angeles and San Bernardino Counties, California, and Clark County, Nevada
5-2204(P)	Callister, *et al.* 1993	Class III Cultural Resource Inventory for Los Angeles Department of Water and Power-Mead to Adelanto Transmission Line Project: Eldorado and Roach Divisions
5-2301(N)	Myhrer, 1995	BLM Cultural Resources Inventory Negative Report No. 5-2301
5-1049(P) IPP	Tucker, 1983	Results of Archaeological Investi-gations Along the Nevada Section of the Proposed Intermountain Power Project (IPP) Intermountain-Adelanto Line 1 (Revised)
5-400(P)	Fowler, *et al.* 1978	Class II Cultural Resources Field Sampling Inventory Along Proposed IPP Transmission Line Corridors, Utah-Nevada-California
5-2324(N)	Rolf, 1996	BLM Cultural Resources Inventory Negative Report No. 5-2324
5-2259(P)	Johnston, 1994	A Class II Inventory of the Proposed Eldorado Valley Land Acts, Clark County, Nevada
5-429(N)	Thomsen, 1978	N5-78-27 Southern Nevada Jackrabbits Hare Scrambles
5-377(N)	Thomsen, 1978	N5-78-9 WRA Shamrock 350 Buggy Race
BR #51	Dames & Moore, 1997	Cultural Resource Survey for the McCullough-Liberty Fiber Optics Project
5-1992(P)	Young, 1990	Archaeological Inventory of the Proposed McCullough II Substation Site and Two 500 kV Tie Lines in Clark County, Nevada
5-4-14; 5-1994	Blair and Edwards, 1990	A Cultural Resource Inventory of the Proposed McCullough-Arden 230 kV Transmission Line for the Nevada Power Company, Clark County, Nevada
5-2-2	Brooks, *et al.* 1977	Final Report On the Preliminary Archaeological Reconnaissance of the Proposed Eldorado/Kaiparowits Trans-mission Line Right-of-Way Corridor and Alternate Routes
5-2139	Rafferty, 1991	A Cultural Resource Inventory of a 14 Mile Long Powerline Right-of-Way in the Eldorado Valley, Clark County, Nevada
4-2-1; 5-166	Brooks, *et al.* 1975	Prehistoric and Historic Research Along the Navajo-McCullough Trans-mission Line Right-of-Way

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Report Number	Author	Report Title
5-260(N)A	Williams, 1977	N5-77-4 Gamblers Hare Scrambles Motorcycle Race
5-260(N)B	Williams, 1977	N5-78-5
2-1-13	UNLV/NAS	Nevada State Highway Department, Railroad Pass Material Sites
5-1955(P)	Davis, *et al.* 1989	Cultural Resources Technical Report for the AT&T Communications Fiber Optic Project between Flagstaff, Arizona and Las Vegas, Nevada: The Nevada Segment
NDOT 078-82R; 5-1042	Moore, *et al.* 1982	NDOT Cultural Resources Report
5-2259(P)	Johnston, 1994	A Class II Inventory of the Proposed Eldorado Valley Land Acts, Clark County, Nevada
MISC #128	Barger, 1997	A Cultural Resources Inventory of the Proposed Modifications to the Mead Substation, Clark County, Nevada
5-1739(P)	Killam, 1987	Cultural Resources Investigations of Mead 69-KV Transmission Lines, Clark County, Nevada
5-165-7	Lawrence, 2000	A Preliminary Report On Previous Cultural Resource Investigations and Sites Likely to Be Encountered Within the Proposed Alignments for the Boulder City U.S. 93 Corridor
1-3-3 & 1-3-1; 5-1123	Bondley and Brooks, 1973	An Archaeological Survey of the Mead-Davis-Parker 230 KV. Trans-mission Line #2
5-1325(N)	Museum of Northern Arizona	Mead to Phoenix 500kV DC Transmission Line Project. Environ-mental Report. Chapter 8 Archaeo-logical and Historical Cultural Resources
MISC #95A	SWCA, 1995	The Mead to Phoenix 500kV Transmission Line Project: An Archaeological Survey of Expanded Right-of-Way for Cable Pulling at Eleven Point-of-Turn Towers
2-8-8	White, 1997	Cultural Resource Investigations of the Power Transmission Lines/Facilities and Portions of the Out-Valley, Southern Nevada Water Authority-Treatment and Transmission Facility, Clark County, Nevada
5-2127(P)	Davis and DuBarton, 1991	Clark County Regional Flood Control District Final Master Plan: 10-Year Plan Facility Cultural Resource Survey Report



Report Number	Author	Report Title
5-2408(P)	Harper, *et al.* 2001	Archaeological Investigation of the Bighorn Power Generation Facility, Primm to Arden Transmission Line and Ancillary Facilities Associated with the Bighorn Generation Project, Clark County, Nevada
Misc #136	Kyle, 1999	Constraint-level Report for WD08-E Line Cultural Resources Survey
5-1968	Young, 1990	Archaeological Inventory of the Nevada Portion of the Wyoming-California Pipeline Company=s Proposed Piute Lateral in Clark County, Nevada
5-25-8	Crabtree, *et al.,* 1980	A Cultural Resource Investigation of Seismic Line #12 Clark County, Nevada and San Bernardino, California
5-2251	Rafferty, 1994	Cultural Resources Inventory Negative Report
5-1705(N)	Diele and Myhrer, 1987	Class III Cultural Resource Inventory Report
5-1948(P); 5-2108(P)	Talbot, *et al.,* 1989	A Class I Overview of the Proposed Wycal Pipeline Corridor Through Utah and Nevada
5-150-14(10)	Wedding, 2001	Cultural Resource Inventory for Nevada Pipe Storage Yards, Contractor Yards and Offloading Sites Issued for Supplemental Filing to Docket No. CP01-422-00 Addendum IV to: Cultural Resource Class I and Class III Investigations for the Proposed 2003 Kern River Expansion Project Nevada
5-458(N)	Martin, 1978	TUP Application for Construction Site, City of Los Angeles
5-1068(N)	Leavitt, 1982	Material Location for IR-15, Stateline Interchange, EA 71084
5-1404(N)	Zale, 1984	Barstow to Vegas ORV Race Course Re-route
5-275(N)	Williams and Rolf, 1977	N5-77-11 Rocket Car Trial
5-374(N)	Thomsen and Wolf, 1978	Chargers West Hare Scrambles Motorcycle Course B SRUP N5-78-7
5-94-2	Rafferty, 1989	A Cultural Resource Inventory of Five Well Locations and Two Water Pipeline Right-of-Way in Clark County, Nevada, and San Bernardino County, California

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4.5 PALEONTOLOGICAL RESOURCES

Project personnel reviewed the literature on the paleontology and geology of the project area using both published and unpublished reports and papers. A record review of all known fossil localities within one mile of the project boundary was performed by Harry Reid Center and San Bernardino County Museum personnel.

Sediments impacted by proposed project excavations have been identified as Precambrian metamorphic and granitic rocks; the Cambrian to Devonian Goodsprings Dolomite; the Devonian Sultan Limestone; the Mississippian Monte Cristo Formation; the Pennsylvanian to Permian Bird Spring Formation; the Permian Kaibab, Toroweap and Coconino Formations (undivided); Tertiary volcanic rocks; and Quaternary Alluvium. A discussion of each unit's lithology and paleontological potential follows below.

The Precambrian (1.7 to 1.4 billion years old) metamorphic and granitic rocks are present in the project area outcrop along Segment 60 in the McCullough Range (Longwell *et al.,* 1965; Stewart and Carlson, 1978). The Precambrian metamorphic rocks primarily consist of gneiss and schist, with rare gneissic granite, pyroxenite, hornblendite, migmatite, pegmatite and marble. Additionally, exposures of highly folded granitic gneiss that has been dated to 1.7 billion years have been reported in certain areas. The Precambrian granitic rocks potentially impacted by the proposed project include 1.4 billion year old porphoryritic granite. The Precambrian metamorphic and granitic rocks have a very low potential to produce significant paleontological resource due to their age and lithology type. Concern for paleontological resources within these units is negligible.

The Late Cambrian to Devonian (approximately 500 to 400 million years old) Goodsprings Dolomite underlies surface exposures of Quaternary Alluvium in both the proposed Table Mountain Substation, and the Proposed IEC Plant areas. The Goodsprings Dolomite consists of thin-bedded, light to dark gray mottled dolomite, with a layer of sandy shale and dolomitic limestone capping the formation locally (Hewitt, 1931). The Goodsprings Dolomite has produced a large quantity of Late Cambrian to Devonian marine invertebrates; however, no significant vertebrate fossils have been reported in the unit. Excavations into Goodsprings Dolomite sediments have the potential to produce invertebrate fossils in the project area.

The Devonian (approximately 417 to 354 million years old) Sultan Limestone underlies surface exposures of Quaternary Alluvium in both the proposed Table Mountain Substation, and the Proposed IEC Plant areas. The unit has three recognized members: the Ironside Dolomite Member, Valentine Member and Crystal Pass Member (Miller *et al*, 1998). Longwell *et al.* (1965), considered the unit to be partially correlative to the Muddy Peak Limestone, which outcrops in the Muddy and Virgin Mountains.

The Sultan Limestone is well known for producing various types of Paleozoic marine invertebrate fossils within the surrounding area. Fossils reported from the Ironside Member include corals, gastropods, and brachiopods (Hewitt, 1931). The Valentine Member has also produced invertebrates of Devonian age, including brachiopods, corals and gastropods (Hewitt, 1931). Excavations into Sultan Limestone sediments in the project area have the potential to impact marine invertebrate fossils from the Paleozoic.

The Mississippian (approximately 354 to 323 million years old) Monte Cristo Formation underlies surface exposures of Quaternary Alluvium in both the proposed Table Mountain Substation, and the Proposed IEC Plant areas. Hewitt (1931) considers the unit to be partially time equivalent to the Rogers Spring Formation. The Monte Cristo Formation has been broken down into five recognized members: the Dawn Limestone Member, the Anchor Limestone Member, the Bullion Dolomite Member, the Arrowhead Limestone Member, and the Yellowpine Limestone Member. All five members have a high potential to contain Paleozoic marine invertebrate fossils within the project area (Hewitt, 1931).

The Late Pennsylvanian to Permian (approximately 323 to 275 million years old) Bird Spring Formation may be underlying surface exposures of Quaternary Alluvium in both the proposed Table Mountain Substation, and the Proposed IEC Plant areas. Five informal members are recognized within the unit: the quartzite member, the siltstone and carbonate member, the lower carbonate member, the middle carbonate member, and the upper carbonate member. General lithology for the entire formation consists of interbedded sandstone, shale, and limestone, overlain by limestone and dolomite.

The Bird Spring Formation has produced a prolific amount of late Paleozoic invertebrates including nautiloids, crinoids, brachiopods, and tabulate and rugose corals. The USGS has recorded multiple fossil localities from Bird Spring sediments in the nearby Las Vegas Range (Longwell, *et al.* 1965). Excavations into the Bird Spring Formation in the project area has a high potential to impact late Paleozoic marine invertebrate fossils.

The Permian (260 to 250 million years old) Kaibab Formation, Toroweap Formation and Coconino Sandstone are exposed at the surface along Segment 10 of the proposed project linears. All three formations have been mapped as one undivided unit in the vicinity of the project area. Lithology and paleontological potential of each formation follows below. The oldest of the undivided units, the Permian (approximately 260 million years old) Coconino Sandstone, consists of cross-bedded white to buff quartz sandstone that was deposited in an aeolian (wind blown) terrestrial paleoenvironment. Unit thickness ranges from 375 to 650 feet thick.

No fossil vertebrates have been reported from Coconino sediments; however, vertebrate and invertebrate trace fossils (tracks and trails) have been reported from the unit (Scott, 2002). The presence of tracks of significant vertebrates indicates that there is the potential for unidentified body fossils of vertebrates to be present within Coconino Sandstone sediments as well.

In its type section, the Permian (approximately 255 million years old) Toroweap Formation unconformably overlies the Coconino Sandstone, and unconformably underlies the Kaibab Formation. The unit has been divided into three recognized members: the Seligman Member, the Brandy Canyon Member and the Woods Ranch Member, and was deposited on a shallow marine shelf in Permian time.

The basal member of the Toroweap, the Seligman Member, consists of yellowish to reddish sandstone and shale with abundant gypsum interbeds. The Brandy Canyon Member is composed of massive gray limestone with rare chert nodules, while the overlying Woods Ranch Member predominately consists of reddish shale and dolomitic sandstone, with rare lenses of gypsum. All three members of the Toroweap Formation have produced an abundant shallow water marine fauna and have a high potential to produce marine invertebrate fossils in the project area.

The youngest unit included in the undivided Permian rocks mapped in the project area has been identified as the Permian (approximately 250 million years in age) Kaibab Formation. The shallow marine Kaibab Formation unconformably overlies the Permian Toroweap Formation, and is broken into two formal members at its type section: the Fossil Mountain Member and the Harrisburg Member.

The Fossil Mountain Member consists of a basal breccia layer containing clasts from the underlying unit, the Toroweap Formation, grading into a dark gray limestone and dolostone containing abundant chert nodules (Sebela and Hess, 1998). The upper member of the Kaibab, the Harrisburg Member, is composed of reddish shale and gypsum with dolomite and limestone interbeds that also contain abundant chert nodules. The Harrisburg Member was deposited on a shallow marine shelf during the regression of the Kaibab Sea. This cyclic regression resulted in the deposition of alternating carbonates (limestone and dolostone) and siliciclastic (shale) units. Both the Fossil Mountain and Harrisburg Members of the Kaibab Formation have yielded the fossilized remains of brachiopods, bryozoans, corals, mollusks, crinoids, ostracods and worms, and have a high potential to produce similar fossils in the project area.

Tertiary (65 to 1.8 million years old) volcanic rocks overlie the Precambrian granitic and metamorphic rocks in the McCullough Range. Segments 60 and 80 of the proposed project all traverse surficial exposures of Tertiary volcanics. Like the Precambrian granitic and metamorphic rocks, due to lithology type, the Tertiary volcanics have a very low potential to contain paleontological resources. Concern for significant fossils during project excavations into volcanic units is negligible.

Most of the project alignments traverse surficial exposures of Quaternary (1.8 million years old to recent) Alluvium in the project area. Depending on location, this unit may contain a significant terrestrial vertebrate fauna from the late Pleistocene. Scott (2002) reports that large mammal bone fragments were recovered from the northern end of Ivanpah Lake in identical Quaternary alluvial deposits. Additionally, the remains of an extinct Pleistocene horse (*Equus* sp.) were found near Glendale, Nevada, in alluvial sediments.

Many of the previously discussed Paleozoic limestone formations, such as the Bird Springs Formation, the Sultan Limestone and the Monte Cristo Formation, have the potential to contain solution caves created by the percolation of acidic groundwater. Similar caves in the area have produced significant vertebrate fossils, such as in the case of Kokoweef Cave in the Ivanpah Mountains, California (Reynolds, *et al.*, 1991a), Antelope Cave in the Mescal Range, California (Reynolds *et al.*, 1991b), and Devil Peak in the Spring Mountains, Nevada (Reynolds, *et al.*, 1991c; Rowland and Needham, 2000). Solution caves have produced extremely large and diverse assemblages (Kokoweef cave has yielded over 200,000 specimens) and are considered extremely useful for comparative studies of late Pleistocene faunas in Arizona, California, and Nevada (Reynolds, *et al.* 1991a). An extremely unique specimen of Shasta ground sloth was recovered from the Devil Peak area in a late Pleistocene solution cave. The Devil Peak sloth is only the second fully complete Shasta ground sloth to be found worldwide, and was associated with an extensive fauna containing reptiles, birds, mollusks, and other mammals (Reynolds, *et al.* 1991c; Rowland and Needham, 2000).

Due to the unique geomorphological nature of these caves, many are small and undiscovered. Each has the potential to contain rare vertebrate fossils and should be mapped and studied accordingly as they are encountered in the project area. Previous studies indicate that both the Kokoweef Cave and Devil Peak Cave formed near the contact between the Sultan Limestone and Monte Cristo Formation, indicating that due to their present geomorphic features, both formations have the potential to contain Pleistocene cave deposits in the project area (Reynolds, *et al.*, 1991a; Reynolds, personal comm., 2002).

Woodrat middens are large concentrations of fecal matter and bones gathered by wood rats, which harden over time. Previous reports indicate that some middens are over 50,000 years old and have high paleontological sensitivity due to the abundant pollen, plant and microvertebrate fossils that have built up in the middens over several thousands of years. Woodrat middens have been used to track changes in vegetation distribution as well as climatic shifts (Scott, 2002). For instance, Kokoweef cave in the Ivanpah Mountains, California, has yielded abundant woodrat middens that have in turn been used to determine the vegetation of the area during the late Pleistocene to early Holocene times (Force, 1991). Woodrat Middens are found in various solution caves and fissures in the project area and represent valuable scientific resources. Results from a detailed records review of the project area conducted by the Harry Reid Center and the San Bernardino County Museum indicate that no significant fossil localities have been found within the project boundaries, or within a one-mile vicinity of the project area (Scott, 2002).

4.6 LAND USE AND ZONING

A large portion of lands that would be affected by construction and operation of the Ivanpah Energy Center (IEC) project (power plant, natural gas pipeline, water supply pipeline, transmission line, and permanent and temporary access roads) is administered by the BLM. Private lands are largely limited to land that has been acquired by the City of Boulder City, which is east of the McCullough Range and includes most of the Eldorado Valley.

The Primm Plant Site also is located on private lands that are being leased by Reliant Energy. Public lands in the area are administered by the BLM Las Vegas Field Office, and all land uses are managed under the *Las Vegas* RMP, (BLM, 1998) as mandated under the *Federal Land Policy and Management Act* (FLPMA) of 1976 (43 CFR 1600).

The RMP was developed through the National Environmental Policy Act (NEPA) process and allows for the use of public lands under a multiple-use/ sustained-yield philosophy. The RMP consists of a "...combination of management directions, allocations, and guidelines that would direct where actions may occur, the resource conditions to be maintained, and use limitations required to meet management objectives." Thus, the RMP is the primary planning document that governs development of the proposed project. The RMP also replaces the Clark County Management Framework Plan (BLM, 1998) for all affected BLM lands. The BLM also is a signatory to the Multi-Species Habitat Conservation Plan (MSHCP) and, by cooperative agreement, has responsibilities to manage lands for species that are included in the MSHCP. The BLM manages lands that are under their jurisdiction that are primarily used for recreation, conservation, mining, communications (scattered locations), and utility corridors.

Private lands in the area are directly administered through the City of Boulder City, Clark County; the Southern Nevada Regional Planning Coalition, a coalition of Clark County; the Clark County School District; and area cities that were formed to deal with regional planning and growth issues. The Clark County Comprehensive Plan, however, recognizes the special status and circumstances of private in-holdings and states "...private in-holdings in federally designated areas in Clark County should be acquired by the Federal Government through land exchanges or other available funding programs when a 'willing seller/willing buyer' situation exists."

The majority of land that would be affected by construction of the Ivanpah Energy Center facility, natural gas pipeline, water supply pipeline, access roads, and transmission line is undeveloped and administered by the BLM. The unincorporated town of Goodsprings is approximately 2.5 miles northwest of the Goodsprings Plant Site and the closest private residences are along SR 161 and Sandy Valley Highway, approximately 2.3 miles northwest of the plant site. The residences are approximately 1.4 miles east of the proposed Table Mountain Substation; however, the substation site is not visible from the residences due to intervening landforms. Land uses within the town of Goodsprings are nearly 100 percent residential; civic facilities include a library, community center, and an elementary school. The unincorporated town of Jean is located at the I-15/SR 161 interchange. Nevada Landing and Gold Strike casinos are located northwest and northeast of the interchange. A Shell gas station and convenience store is located near the I-15/SR 161 interchange, along the north side of SR 161. A Mobil Oil gas station and convenience store is located east of the interchange, along the north side of the road. Other facilities east of the interstate include the Goodsprings Justice Court, a post office, Letica Corporation, Jean Airport, Clark County Fire Department Station No. 87, Jean Medical Center, and the Nevada Welcome Center. The Southern Nevada Correctional Center

(SNCC) is east of the Union Pacific Railroad (UPRR) and approximately 0.9 miles east of I-15. There are no conventional single-family or multi-family residences in Jean.

The Primm Plant Site is located in the vicinity of the Nevada/California State Line, a developed area that is dominated by Buffalo Bill's Casino, and Primm Valley Resort Casino. Reliant Bighorn Generating Facility and the Ivanpah Energy Center Primm Plant Site are approximately 1.0 mile east of the nearest business establishment, on land that has been zoned for Heavy Industrial Use (M2). There are no residential areas in Primm; however, trailers are located on casino property for temporary use by casino employees.

The area east of the McCullough Range to the Mead Substation is within the Eldorado Valley. Eldorado, Marketplace, and McCullough substations are west of U.S. 95; Mead Substation is east of the highway. Numerous transmission lines cross Eldorado Valley in a generally northeast-southwest configuration. There are no residential or commercial structures within proximity to the area where the proposed IEC-Mead Transmission Line would cross. The closest such features are located in Boulder City, approximately 1.5 miles north of the substation.

The Ivanpah Energy Center Goodsprings Plant Site is on land that is administered by the BLM, but is presently zoned by Clark County as Rural Open Land (RU) which is limited to one dwelling per two-acre tract. Ivanpah Energy Center, LP filed a zone change request to rezone 35.9 acres from RU to industrial (M2). A zoning hearing was held on March 7, 2002, which resulted in a decision, by the County to delay a decision regarding the rezoning application. Land required for the water treatment plant is state-owned and zoned by Clark County as RU. A special use permit from Clark County will be needed to permit construction of the water treatment plant.

4.7 RANGELAND MANAGEMENT

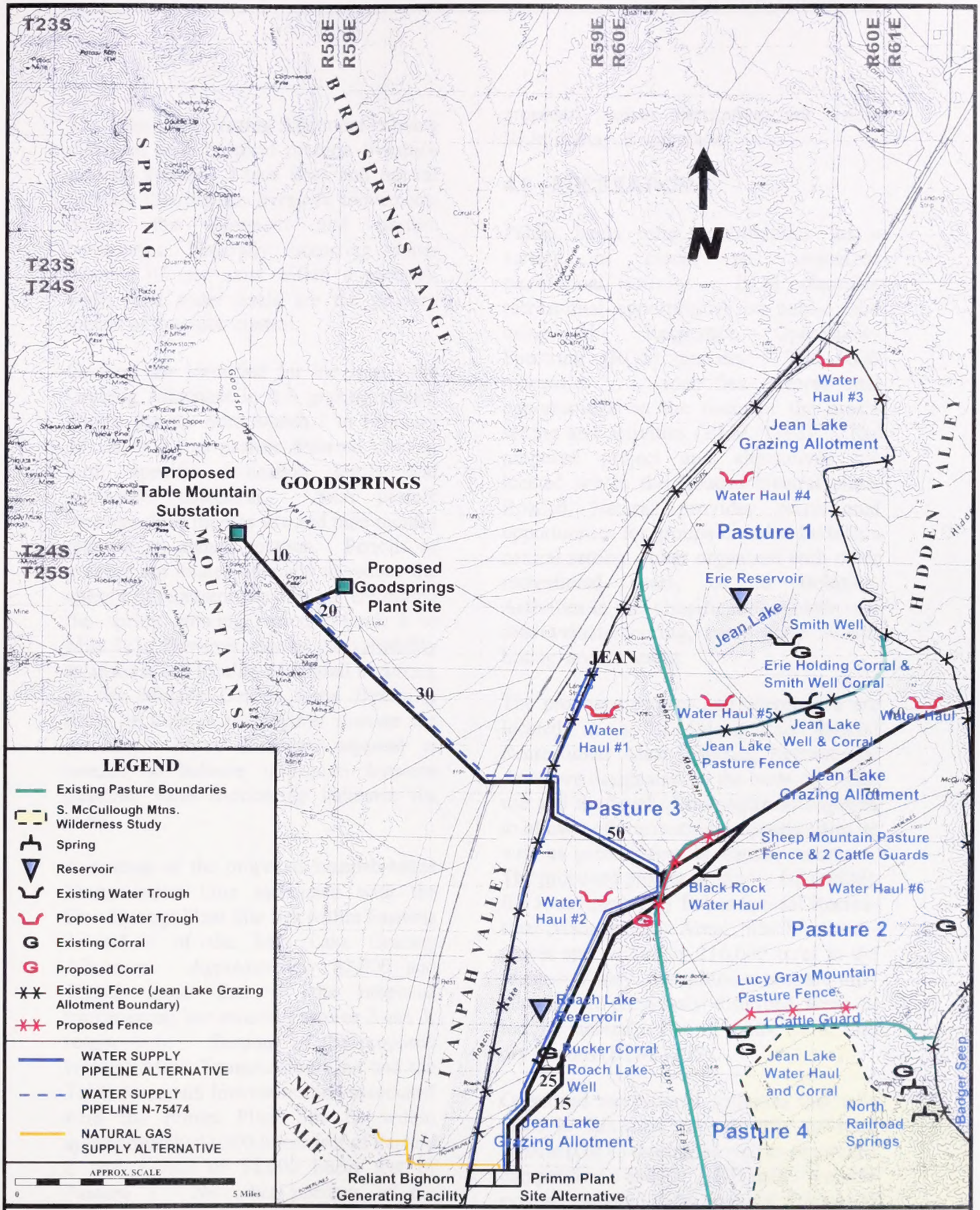
The Jean Lake Grazing Allotment (Allotment #15416) is located approximately 30 miles south of Las Vegas, east of and contiguous to Jean and Primm, Nevada. It is bounded on the west by the UPRR and bounded on the east by the McCullough Range and Lucy Gray Mountains. The allotment totals approx-imately 119,777 acres and varies in elevation from 2,624 feet amsl at Roach Lake playa to 7,026 feet amsl in the McCullough Range.

The grazing allotment occupies portions of two valleys and several mountain ranges. Roach Lake Valley is on the west side of the allotment and represents the northern portion of Ivanpah Valley. Jean Lake Valley is in the east side of the allotment. Sheep Mountain is along the western side of a portion of the allotment; the McCullough Range is along the northeastern margin of the allotment and the Lucy Gray Mountains are along the southeastern margin.

Jean Lake Grazing Allotment is considered by the BLM to be ephemeral and is managed under ephemeral range management rules. The ephemeral classification is based on highly variable forage production that results from extremes in rainfall, temperature, and wind conditions. On an intermittent basis, a substantial amount of forage may be available and usable by livestock. Since it is not possible to predict forage production from year to

year, livestock grazing use is adjusted based upon a reasonable potential for seasonal forage production. Livestock grazing may be authorized upon application, pursuant to any management requirements for the allotment. The number of livestock permitted at any one time may vary during each grazing year.

The Jean Lake Grazing Allotment is shown on Figure 4-4.



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FIGURE 4-4
RANGELAND MANAGEMENT

The Jean Lake Grazing Allotment is being managed as a deferred rotation livestock grazing system. Fence lines and natural barriers that impede livestock movements define the allotment and pasture boundaries. Naturally occurring water sources (if any exist within a pasture), wells, and water hauls are the primary means of livestock control.

Grazing use identified for the Jean Lake Grazing Allotment in this grazing system allows for use from March 1 to February 28 under a four-pasture deferred rotation with specific utilization levels and vegetative objectives. Each pasture receives three months use and nine months rest on an annual rotation. Periods of grazing are rotated annually to reduce the chance of recurrent use of a pasture during the spring growing period (March 1 to May 31). However, due to the variability in amount and locality of rainfall occurring in the Mojave Desert, some flexibility must be built in to properly manage the resource. Move dates are adjusted as needed to balance utilization between pastures when monitoring indicates the need.

A portion of the proposed Ivanpah-Mead Transmission Line associated with the Goodsprings Plant Site lies within Pastures 2 and 3 of the Jean Lake Grazing Allotment. Approximately 42,300 and 13,100 linear feet of the proposed transmission line crosses Pastures 2 and 3, respectively. Portions of the proposed Ivanpah-Mead Transmission Line and the Table Mountain Interconnection associated with the Primm Plant Site lie within approximately 42,300 linear feet of Pasture 2 and a total of 54,800 linear feet of Pasture 3. No other portions of the proposed project alternatives are within BLM managed rangeland.

4.8 RECREATION

Public lands offer opportunities for a variety of casual and organized recreational activity. BLM classifies recreational opportunities on public land using the Recreation Opportunity Spectrum (ROS) process. The ROS process "... identifies recreational opportunities on the basis of the area's setting and activities (BLM, 1998)." The proposed project and alternatives are located within the Roaded Natural class. Roaded Natural provides recreational opportunities for groups or individuals in a natural setting, either organized with other recreational users, or in isolation. Activities in this classification include off-road vehicle touring, competitive events, hiking, and camping.

The proposed project and alternatives are located in a BLM-designated Special Recreational Area. Special Recreational Areas are designated on the basis of visitor use and the level of management required to allow both recreational opportunities as well as preservation of natural resources. The proposed project primarily falls within the Jean/Roach Dry Lakes Special Recreation Management Area, which encompasses approximately 216,000 acres in the Ivanpah Valley. Permitted events are only allowed on previously disturbed areas in tortoise habitat, existing roads, trails, and dry washes (BLM 1998).

Organized recreational activities that take place in this area are primarily off-road vehicle (ORV) touring as well as organized competitive events. Off-road vehicle events usually draw several thousand

visitors a year to the area. Organized ORV competitive race events, sponsored by associations such as the Southern Nevada Off-Road Enthusiasts (S.N.O.R.E.), SCORE International, Motorcycle Racing Association of Nevada (MRAN), Southern Nevada ATV Racing Enthusiasts (SNARE), and Best in the Desert (BITD), occur throughout the year. Other ORV events include truck-buggy racing, rally-cross events, and all-terrain vehicle (ATV) motorcycle racing. Most racing events primarily are held on Saturday or Sunday during the fall and winter. The Jean/Roach Dry Lakes Special Recreational Area also provides opportunities for aerial acrobatics and skydiving west of I-15.

Designated recreational areas and recreational activities in the Jean/Roach Dry Lakes Special Recreational Areas are provided in Figure 4-5. Table 4-9 summarizes BLM-permitted recreational activities occurring in the Jean Lake/Roach Lake and the Eldorado Valley area during the 2002 calendar year. A listing of Special Recreation Permits that have been granted by the BLM for 2002 calendar year is provided in Appendix G.

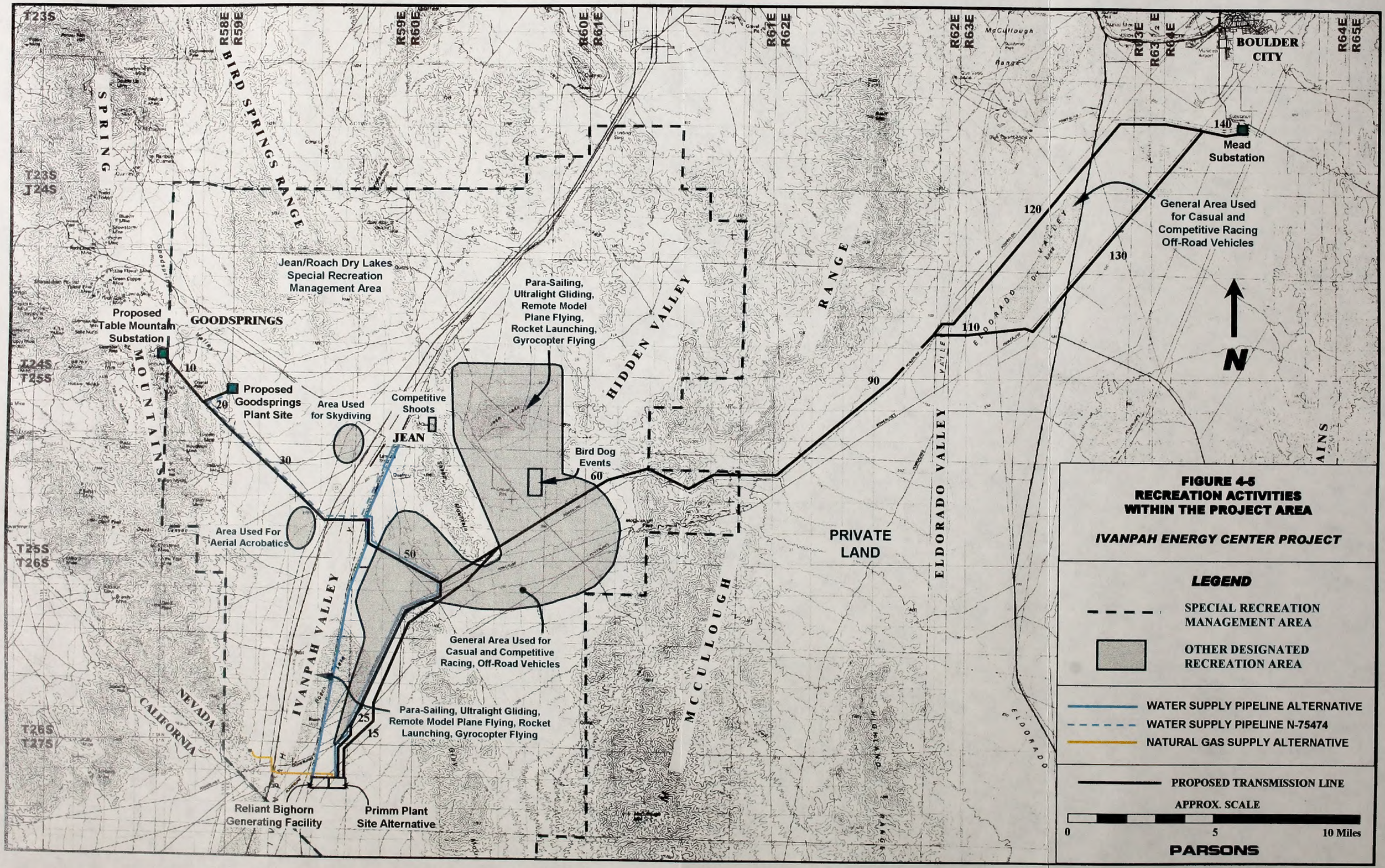
Table 4-9 BLM Permitted Recreational Activities Within the Project Area 2002 Calendar Year

Permitted Activity	Number of Permits
Off-Road Vehicle Events	2
ATV Motorcycle Racing	2
Competitive Shoots	3
Rocket Launches	1
Automotive Vehicle Testing	1
Bird Dog Events	1
Off-Road Riding School	1

A community initiative is underway to develop a non-motorized backcountry trail through the Spring Mountains. A portion of the trail would be located near the community of Goodsprings and would provide visitors a range of recreational opportunities including hiking, camping, horseback riding, and scenic enjoyment. At the time of this writing, the Spring Mountains Perimeter Trail was still in the early planning stages (Shelp, 2002).

A small portion of the proposed project where the transmission line crosses the McCullough Range is adjacent to BLM-designated Southern Nevada Extensive Recreation Management Areas (ERMA) on the north side and to the south. According to the Las Vegas RMP, ERMAs are areas "where recreation is unstructured and dispersed and where minimal recreation-related investments are required. ERMAs provide recreation visitors the freedom of choice with minimal regulatory constraint. (BLM, 1998)"

During the months of November and December (November 9 – December 8), big game hunting for Bighorn Sheep occurs in the McCullough Mountain Range


T23S
R58E
R59E
R60E
R61E
R62E
R63E
R63½E
R64E
R65E
BOULDER CITY
SPRING
BIRD SPRINGS RANGE
T23S
T24S
Jean/Roach Dry Lakes
Special Recreation
Management Area
Para-Sailing,
Ultralight Gliding,
Remote Model
Plane Flying,
Rocket Launching,
Gyrocopter Flying
HIDDEN VALLEY
RANGE
Mead
Substation
140
120
130
110
90
General Area Used
for Casual and
Competitive Racing
Off-Road Vehicles
N
Proposed
Table Mountain
Substation
GOODSPRINGS
MOUNTAINS
T24S
T25S
10
20
Proposed
Goodsprings
Plant Site
Area Used
for Skydiving
Competitive
Shoots
JEAN
30
Bird Dog
Events
60
Area Used For
Aerial Acrobatics
50
T25S
T26S
IVANPAH VALLEY
PRIVATE
LAND
ELDORADO VALLEY
MCCULLOUGH
RANGE
General Area Used for
Casual and Competitive
Racing, Off-Road Vehicles
NEVADA
CALIFORNIA
T26S
T27S
25
15
Para-Sailing, Ultralight Gliding,
Remote Model Plane Flying, Rocket
Launching, Gyrocopter Flying
Reliant Bighorn
Generating Facility
Primm Plant
Site Alternative
FIGURE 4-5
RECREATION ACTIVITIES
WITHIN THE PROJECT AREA
IVANPAH ENERGY CENTER PROJECT
LEGEND
SPECIAL RECREATION
MANAGEMENT AREA
OTHER DESIGNATED
RECREATION AREA
WATER SUPPLY PIPELINE ALTERNATIVE
WATER SUPPLY PIPELINE N-75474
NATURAL GAS SUPPLY ALTERNATIVE
PROPOSED TRANSMISSION LINE
APPROX. SCALE
0
5
10 Miles
PARSONS



and Spring Mountains. Big game hunting is regulated under Nevada Department of Wildlife (NDOW). According to NDOW, during the 2001 hunting season, there was a take of approximately six Bighorn Sheep in the McCullough Range and approximately four in the Spring Mountains (NDOW, 2002).

The remaining 22 miles of the project area, where the transmission line crosses the Eldorado Valley floor, are located within private property. While the area is not managed by BLM, recreation occurs on the dry lakebed, west of U.S. 95. These activities include casual off-road touring and all-terrain vehicle motorcycle touring. Organized events, such as off-road competitive race events and rocket launching, are permitted through the City of Boulder City (City of Boulder City, 2002).

4.9 TRANSPORTATION

The vehicular (road and highway) transportation network in Ivanpah Valley is largely limited to I-15, State Route (SR) 161, local roadways, and unimproved roads.

Access to the Ivanpah Energy Center (Goodsprings or Primm sites), transmission line corridors, water treatment plant, water supply pipeline corridors, and natural gas pipeline corridor (Primm Plant Site) would be along existing highways, roads, and unimproved (gravel) roads in the area. Interstate 15 serves as the primary access into and from the Ivanpah Valley and SR 161 (Jean to Goodsprings Highway) would be used for the movement of construction equipment, construction workers, and facilities operations workers to the Goodsprings Plant Site. Workers from the Sandy Valley area would use the Sandy Valley Road. Access to the Primm Plant Site would be I-15, existing local roads, and the main road to the Reliant Bighorn Power Plant.

Two roadways traverse the Ivanpah Valley in the vicinity of Jean and Goodsprings. Interstate-15, a four-lane limited access highway provides regional north-south access to Jean, Nevada, and serves as the primary link between Las Vegas and southern California. SR 161, also known as the Jean to Goodsprings Highway, provides access from the interstate to an existing gravel road (County Road 53Y) that leads to the Goodsprings Gas Compressor Station and the Goodsprings Plant Site. County Road 53Y is a RS 2477-designated road.

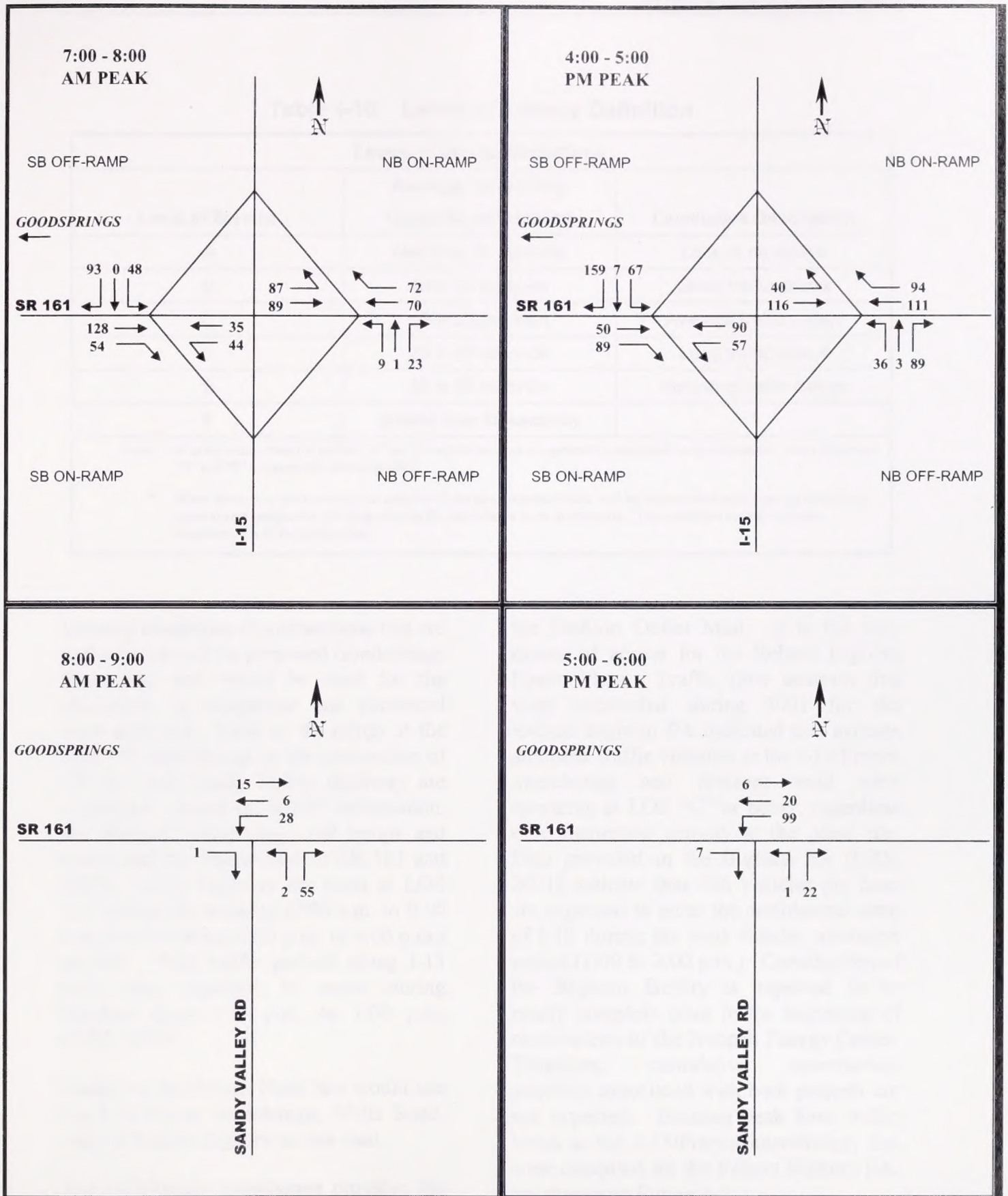
State Route 161 is two-lanes-wide, has minimal shoulders, and numerous changes in the vertical alignment (dips and rises) that restrict the line-of-sight of travelers. The I-15 interchange at Jean is approximately 20 miles south of Las Vegas; the gravel access road to the project site along SR 161 is approximately 6.0 miles from the I-15/Jean Interchange. The gravel access road from SR 161 to the plant site (County Road 53Y) is approximately 1.5-miles-long.

Although the main road from SR 161 to the Goodsprings Compressor Station is sufficiently wide and maintained to accommodate heavy equipment, County Road 53Y south of the compressor station road is narrow, abrupt and numerous changes in the vertical and horizontal alignment make it inadequate for the movement of heavy equipment. If the Goodsprings Plant site were to be developed, improvements to County Road 53Y would be required.

Recent data that were included in the Table Mountain Draft EIS (PBS&J, 2002) and the Reliant Bighorn EA (URS, 2001) have been presented to address traffic volumes along I-15, the I-15/SR 161, interchange and at the intersection of SR 161 and Sandy Valley Road. Data provided by Nevada Department of Transportation and included in the Table Mountain DEIS indicate that traffic flows on SR 161 immediately west of the I-15/SR 161 interchange average approximately 270 vehicles per hour from 7:00 a.m. to 9:00 a.m. and 316 vehicles per hour from 4:00 p.m. to 6:00 p.m. Although data are not available regarding the amount of traffic that originates from or terminates at the parking lot of Nevada Landing (casino) or a Shell gas station that are west of the interchange, a large number of the vehicles are likely to originate or terminate in either Goodsprings or Sandy Valley. Additional data available for the SR161/Sandy Valley Road intersection (approximately 6 miles west of I-15) indicate that an average of 103 vehicles per hour would pass the Proposed Goodsprings Plant Site access drive during the period from 7:00 a.m. to 9:00 a.m. and 142 would pass the site between 4:00 p.m. and 6:00 p.m. (Figure 4-6).

Based on information received during Scoping Meetings in Goodsprings and Sandy Valley, a large number of residents in both communities are employed as shift workers in Las Vegas and surrounding areas. Information received during the meetings also indicates that "peak" highway traffic along SR 161 (and Sandy Valley Highway) does not only occur during the hours of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m., but as a series of several "peak hours" that extend throughout the night. Although data are not available to report traffic flows over one or more 24-hour/multi-day periods, it is unlikely that other "peak" periods would experience traffic volumes in excess of those reported for morning and evening hours.

Traffic movement and congestion information was obtained from Nevada Department of Transportation (NDOT, 2001) to identify existing Level of Service (LOS) at the Jean/I-15 interchange and the intersection of SR 161 and Sandy Valley Highway. The LOS is a qualitative measure based on existing roadway capacity and traffic volumes. The methodology describes the operating conditions of a defined segment of roadway or intersection and includes variables that affect traffic flow, including: travel speed, travel time, vehicular delays, motorists sight distance, traffic interruptions, and the freedom to maneuver. The six levels of service range from "A" to "F." Level A is defined as having ideal flow conditions with little or no delays; extreme delays and gridlock characterize level "F." Level of Service definitions (for unsignaled intersections) are described in Table 4-10.



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FIGURE 4-6
TRAFFIC VOLUMES
(GOODSPRINGS PLANT SITE)

Table 4-10 Levels of Service Definition

Levels of Service Definitions		
Level of Service	**Average Total Delay (seconds per vehicle)**	**Qualitative Description**
A	less than 10 seconds	Little or no delays
B	10 to 15 seconds	Short traffic delays
C	15 to 25 seconds	Average traffic delays
D	25 to 35 seconds	Long traffic delays
E	35 to 50 seconds	Very long traffic delays
F	greater than 50 seconds	*

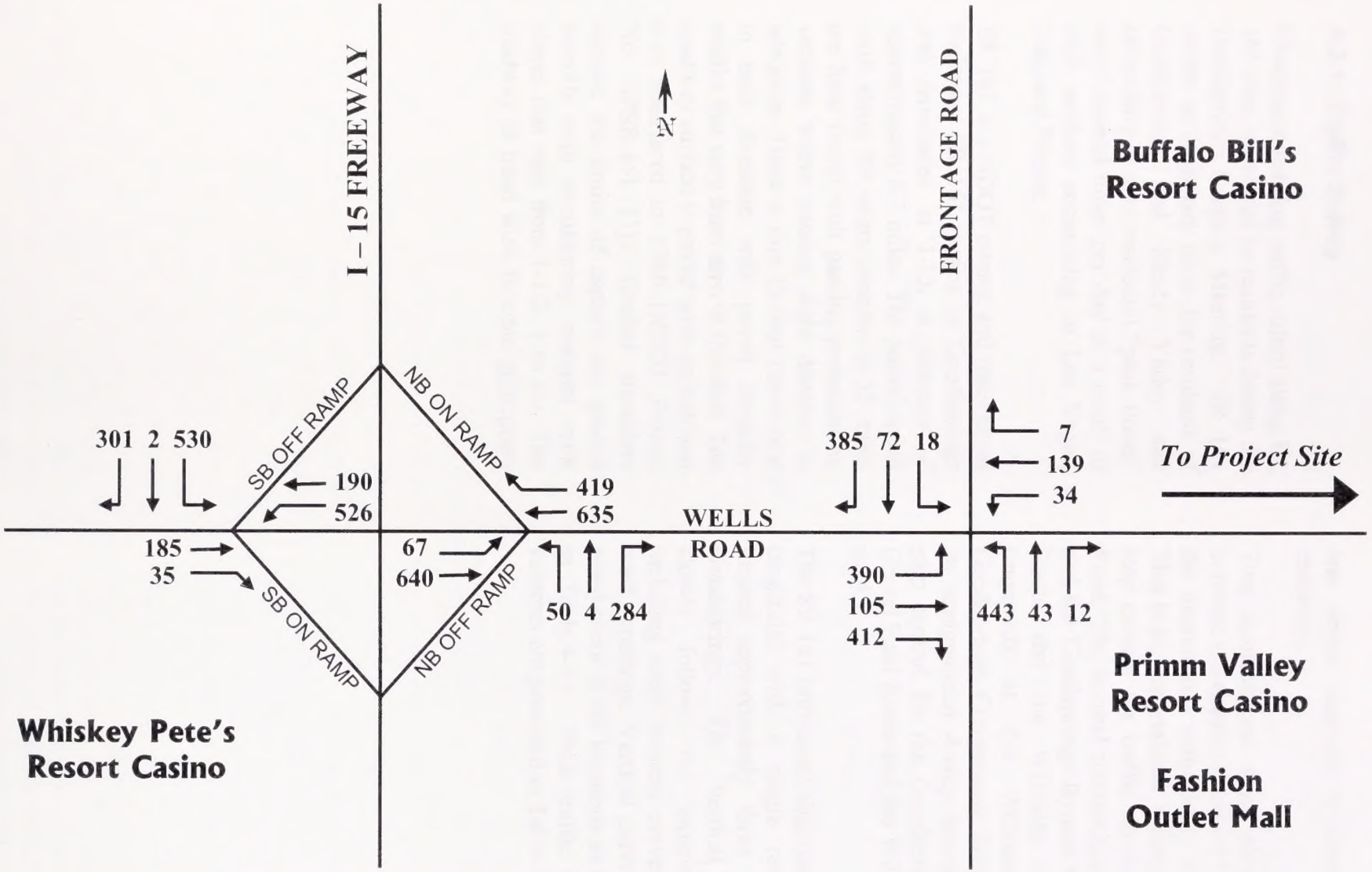
Note: In urban areas, levels of service "A" to "D" at intersections are generally considered to be acceptable; levels of service "E" and "F" are generally not acceptable.

* When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in an intersection. This condition usually warrants improvements to the intersection.

Existing conditions at intersections that are in the vicinity of the proposed Goodsprings Plant Site and would be used for the movement of equipment and personnel were analyzed. None of the ramps at the Jean/I-15 interchange or the intersection of SR 161 and Sandy Valley Highway are signalized. Based on NDOT information, the Jean/I-15 interchange (all ramps and roads) and the intersection of SR 161 and Sandy Valley Highway are rated at LOS "A" during the morning (7:00 a.m. to 9:00 a.m.) and evening (4:00 p.m. to 6:00 p.m.) periods. Peak traffic periods along I-15 have been reported to occur during Sundays from 1:00 p.m. to 3:00 p.m. (URS, 2001).

Traffic to the Primm Plant Site would use the I-15/Primm interchange, Wells Road, and the Reliant Bighorn access road.

The I-15/Primm interchange provides the only access to Whisky Pete's Casino, Buffalo Bill's Casino, Primm Casino, and the Fashion Outlet Mall. It is the only means of access for the Reliant Bighorn Power Plant. Traffic flow analyses that were conducted during 2001 for the Reliant Bighorn EA indicated that average and peak traffic volumes at the I-15/Primm interchange and frontage road were operating at LOS "C" or better, regardless of construction activity at the plant site. Data provided in the Bighorn EA (URS, 2001) indicate that 526 vehicles per hour are expected to enter the northbound ramp of I-15 during the peak Sunday afternoon period (1:00 to 3:00 p.m.). Construction of the Bighorn facility is expected to be nearly complete prior to the beginning of construction of the Ivanpah Energy Center. Therefore, cumulative construction activities associated with both projects are not expected. Existing peak hour traffic levels at the I-15/Primm interchange, that were compiled for the Reliant Bighorn EA, are shown on Figure 4-7.



EXISITING WEEKEND PEAK HOUR VOLUME

SOURCE: URS 2001

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FIGURE 4-7
TRAFFIC VOLUMES
(PRIMM PLANT SITE ALTERNATIVE)

4.9.1 Traffic Safety

Concerns regarding traffic safety along SR 161 were expressed by residents during the Goodsprings Scoping Meeting. SR 161 serves as a primary route for residents of Goodsprings and Sandy Valley and (according to area residents) "peak flows" occur several times per day as a result of shift workers commuting to Las Vegas, Jean, and Primm.

SR 161 is a NDOT owned and maintained highway. SR 161 begins in Goodsprings and terminates at I-15, a distance of approximately 6.7 miles. The posted speed limit along the entire corridor is 55 miles per hour (mph) with passing permitted on sections where passing sight distance is adequate. There is one 12-foot travel lane in each direction with paved shoulder widths that vary from zero to five-feet. The roadway surface is paved with asphalt and was resurfaced in 1996 (NDOT Project No. SPSR-161 [1]). Graded shoulders outside the limits of asphalt are graded smooth with shouldering material with slopes that vary from 1-1/2 :1 to 6:1. The roadway is lined with flexible guideposts and object markers to identify culvert crossings.

Two intersections exist along SR 161 between Goodsprings and I-15. The first is the intersection with Sandy Valley Road. This is an unsignalized T-intersection with stop control for traffic on Sandy Valley Road. The second intersection at SR 161 and the Goodsprings Bypass Gravel Haul Route and the Williams utility road (unpaved) at the Williams (KRGT) Goodsprings Compressor Station. This is an unsignalized 4-way intersection with stop control for the Goodsprings Bypass Gravel Haul Route and the Williams utility road.

The SR 161 horizontal alignment is largely tangential with a single reverse curve located approximately three miles from Goodsprings. The vertical alignment closely follows the existing ground, including short vertical curves at natural wash crossings. Vertical curves (dips and rises) occur at six locations as summarized in Table 4-11. Peak traffic hour traffic volumes are provided in Table 4-12.

Table 4-11 Summary of SR-161 Vertical Curves

Station	Length of Curve (Feet)	K-Value*	Approximate Design Speed
50+10	75	17.3	28
220+60	200	27.7	33
270+30	200	45.1	41
285+30	200	32.5	37
297+45	200	27.0	33
332+50	200	48.0	42

Source: NDOT Plan and Profile of Proposed State Highway, Clark County, Jean to Goodsprings, 1937.
*Amount of change in a curve.

Traffic volumes on SR-161 are relatively low as summarized below in Table 4-12.

Table 4-12 SR 161 Year 2002 Traffic Volumes

Northbound	Traffic Volume
AM Peak Hour	173
PM Peak Hour	263
Southbound	
AM Peak Hour	185
PM Peak Hour	196

Source: Table Mountain Wind Generating Facility Draft Environmental Impact Statement, January 2002. These volumes include the proposed Table Mountain Wind Generating Facility.

The proposed project will generate approximately 20 trips that involve the movement of oversized equipment that will be used at the Ivanpah Energy Center. This equipment may require a permit from NDOT, including the use of pilot cars to the front and rear of the proposed load. The pilot car would eliminate the sight distance concerns at the vertical curve locations listed in Table 4-11 (above) by allowing an adequate buffer between the oversized load and the public traffic.

Numerous unimproved (gravel) roads are located in the vicinity of the proposed plant site and along proposed and alternative transmission line routes. Nearly all unimproved roads have been designated as County Roads. Access to the plant site from SR 161 would be along County Road 53Y or from the south along County Road 28, an undesignated trail, and County Road 53Y. Designated county roads in the vicinity of the Ivanpah Energy Center are shown on Figure 3-3.

Two roadways traverse the proposed plant site area near Primm. Interstate 15 (I-15), a four-lane limited-access highway provides north-south access to the alternative plant site. Wells Road, a local east-west roadway at Primm, primarily serves two casinos on the east side of I-15 and one casino on the west side of the interstate.

Access to the plant site area would be along an existing asphalt-paved extension of Wells Road and a to be constructed grade-separated railroad crossing. Existing roads within the Reliant Bighorn Generating Facility would be used to access the IEC plant site.

Preliminary data compiled for a traffic study recently conducted for the Reliant Bighorn EA indicate that the peak traffic period for the three intersections within the Primm area occurs during Sundays from 1:00 p.m. to 3:00 p.m. (URS, 2001). According to the traffic study, existing roadways and intersections in the Primm area would operate and maintain an acceptable LOS "C." The analysis included worst case conditions during the 2002 peak construction and 2003 post-construction periods of the Reliant Bighorn plant (URS, 2001). Refer to Table 4-10 for levels of service definitions.

U.S. Highway 95 is the only paved road that would be crossed by the proposed transmission line in Eldorado Valley. The highway is two-lanes-wide and is a major link between the Las Vegas area and Searchlight, Laughlin, and Bullhead City. Transportation facilities within the project area are shown in Figure 4-8.

Construction of the Ivanpah Energy Center at Primm would utilize the I-15/Primm interchange, a 0.5-mile-long segment of Wells Road, and the main road to the Reliant Bighorn site. The 0.5-mile-long segment of Wells Road is two-to-three lanes wide and turning lanes are provided for access to area casinos. The 0.5-mile-long main entrance to the Reliant facility is paved, not open to the public, and the UPRR at-grade crossing is gated.

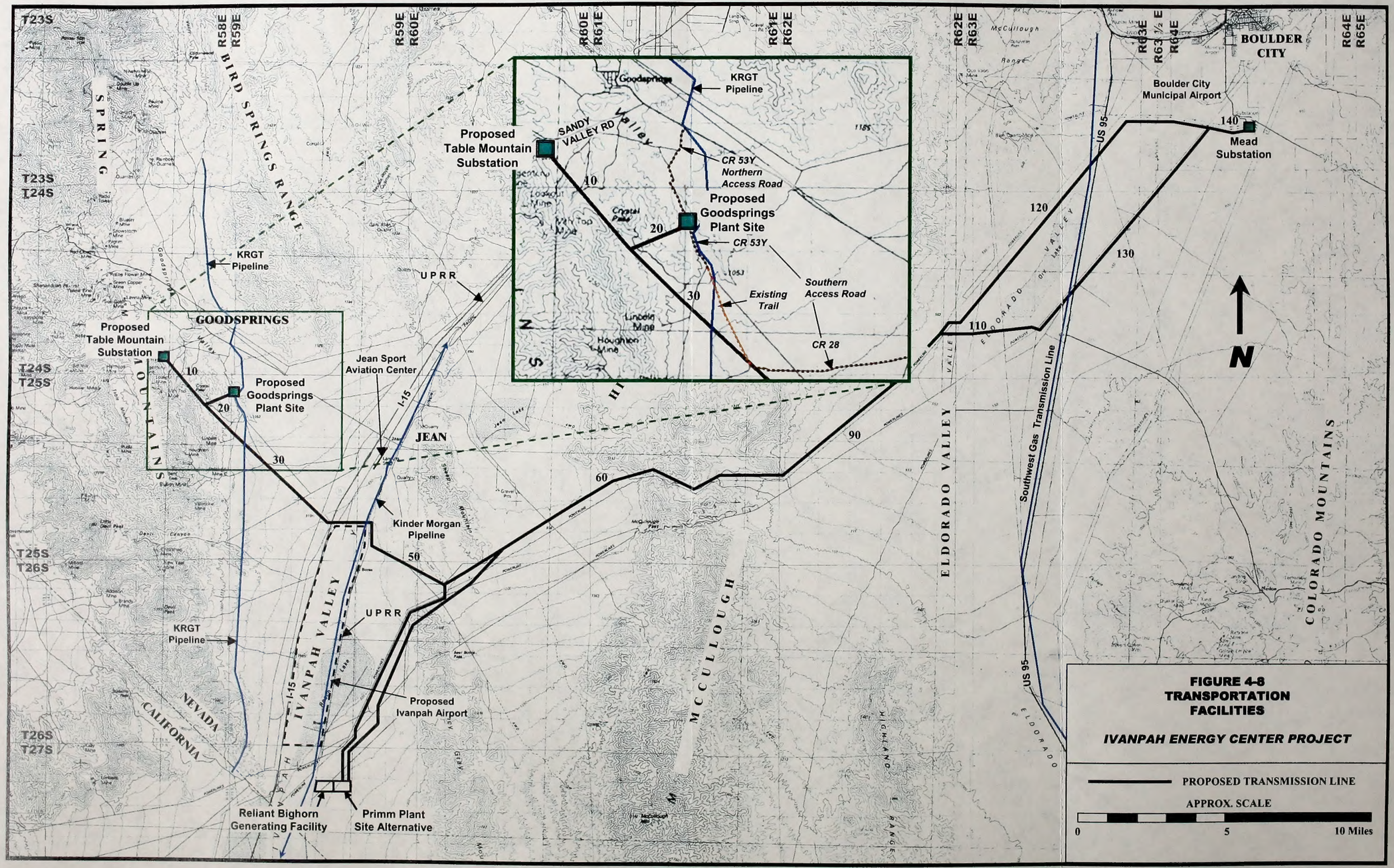


FIGURE 4-8
TRANSPORTATION FACILITIES

IVANPAH ENERGY CENTER PROJECT



4.9.2 Railroad Facilities

The UPRR operates a rail line that extends through Ivanpah Valley from the vicinity of the California/Nevada state line (near Primm, Nevada), through Jean and Sloan, to Arden. The mainline track consists of a single track set along the majority of the alignment; sidings are located near Primm and in the vicinity of Jean. All roadway crossings are at-grade with the exception of grade-separated crossings under I-15, approximately 3.5 miles north of Jean and several narrow crossings that provide access along unimproved roads that are also used as drainageways. The at-grade crossing at Jean is the only signalized crossing in the area. Rail traffic through the area averages 30 trains per day, 15 trains in each direction (URS, 2001). The rail line would be crossed by the IEC-Mead Transmission Line (Goodsprings Plant Site Alternative) or the IEC-Table Mountain Transmission Line (Primm Plant Site) approximately 4.0 miles south of Jean. Railroad right-of-way at the crossing is 200 feet wide.

4.9.3 Aviation Facilities

Clark County Department of Aviation operates the Jean Sport Aviation Center, a facility that is used by general aviation. The airport has two runways, both of which are paved. The main runway is 4,600 feet long and 75 feet wide; the secondary runway, which is designated for glider aircraft, is 3,700 feet long and 60 feet wide. Both runways have basic markings that comply with visual flight rules and a 20:1 approach slope, which extends 1,200 feet beyond the end of the runway (Clark County Department of Aviation, 1997). The runways are oriented generally southwest-northeast. A portion of proposed ROW is south of the Jean Sport Aviation Center, and approximately 1.8 miles (approximately 9,400 feet) southwest of the longest runway.

Las Vegas Department of Aviation is planning to construct a new international airport in the Ivanpah Valley. The facility would be located on a 6,000-acre tract east of I-15 and west of the UPRR, between Jean and Primm. The area is currently undeveloped and under BLM administration; airport development would be made possible by a land disposal action.

The City of Boulder City Municipal Airport, located south of Boulder City in Eldorado Valley, is a general aviation facility providing services for both private and commercial aircraft. Aeronautical services include flight training, parachuting, medical transport, emergency medical evacuation, and air taxi services. The airport maintains two asphalt runways; the main runway is 4,800 feet long and 75 feet wide; the secondary runway is 3,850 feet long and 75 feet wide.

4.9.4 Pipelines

Kinder-Morgan Corporation operates the CalNev Pipeline that roughly parallels the west side of the UPRR from Jean to Primm. Two pipelines occupy the right-of-way.

Williams Brothers Pipeline Company operates the Kern River Gas Transmission (KRGT) pipeline and associated Goodsprings Compressor Station that are located along the west side of the Ivanpah Valley. The pipeline delivers natural gas

from western Wyoming to users in Utah, Nevada, and southern California. The KRGT pipeline corridor lies adjacent to the southeastern portion of the IEC Goodsprings Plant Site and would provide a reliable natural gas supply to the facility. Development of the Primm Plant Site would require a 3.2-mile-long pipeline from the KRGT to plant site property. KRGT is presently undergoing expansion that will more than double the present delivery capacity of the system (Kern River 2003 Expansion Project EIS, 2002).

4.10 HAZARDOUS MATERIALS

Hazardous materials may be present coincidental to industrial activities in the project area. However, none are known to be present in sufficient quantity within the project area to affect the project.

4.11 VISUAL RESOURCES

The visual resources analysis was prepared in accordance with the BLM Visual Resource Management (VRM) Guidelines (BLM, 1986) and the BLM Manual Handbook 8431-1 Visual Resource Contrast Rating (BLM, 1986b). The VRM guidelines provide a process for protecting and managing the scenic quality of public lands.

The VRM process identifies the affected landscapes and assigns visual values based on the landscape's scenic quality, sensitivity to viewers, and distance zones. Scenic quality is determined by evaluating the overall character and diversity of landform, vegetation, water, color, and cultural features. Viewer sensitivity measures the degree of concern for change in the landscape's visual character. Distance zones categorize the landscape's relative visibility from key observation points or travel routes into three zones: foreground-middleground (three to five miles), background (approximately 15 miles), and seldom seen (not visible).

A contrast rating evaluation is conducted from the most critical viewpoints, or key observation points (KOPs), to determine the degree to which visual contrast is created by the proposed project. Nine KOPs have been identified for this project. The evaluation compares project features with features in the landscape. Additionally, the process assists in identifying mitigation measures to reduce impacts to visual resources.

4.11.1 Project Setting

The Ivanpah Energy Center at the Proposed Goodsprings Plant Site would require construction of the power plant within northwestern Ivanpah Valley. Those associated with the Primm Plant Site Alternative would be located in the southeastern portion of the valley, near the Nevada/California state line. Transmission lines associated with either project would extend through Ivanpah Valley, the McCullough Range, and into the Eldorado Valley. Overall the landforms and vegetation characteristics of the project area provide a blend of color including browns, tans, subtle shades of greens, and grays.

Ivanpah Valley

The western most portions of the project would be located in the Ivanpah Valley. Mountain ranges border the valley floor on both the east and west sides. The topography in the Ivanpah Valley ranges from 2,624 feet amsl in the valley to 7,026 feet amsl in the McCullough Range to the east. The valley terrain is generally flat with numerous dry washes to the base of the mountain ranges, which dominate

background views. Vegetation consists of native desert flora such as creosote bush and white bursage.

In the far western portion of the valley, near the community of Goodsprings, hills alternating with shallow valleys lie at the base of the Spring Mountain Range. Vegetation is more varied in the foothills than the valley floor with creosote, bursage, yucca, cacti, and Joshua trees.

Two major roadways are present in Ivanpah Valley. The I-15 corridor divides the valley from the north to the south. I-15 is a heavily traveled interstate and a distinct feature in the landscape. SR 161, a two-lane paved road runs in a westerly-easterly direction between the communities of Jean and Goodsprings.

There are numerous manmade modifications present in the area. Above and below ground utilities including high voltage transmission and distribution lines criss-cross the valley floor. Large lattice structures traverse the terrain from north to the south near the base of the Lucy Gray Mountains on the east side of the valley. Other existing transmission line structures are aligned in a northeasterly to southwesterly direction. An existing transmission line with self-weathering structures parallels a newly constructed transmission line with gray-painted structures in the northern portion of the valley. The parallel transmission lines cross the valley in an easterly-westerly direction approximately 12 miles south of Jean. Gray-painted structures also exist along the east and west side of the I-15 near Jean. Similar gray-painted structures are present along the north side of SR 161. The new Reliant Bighorn-Arden Transmission Line crosses SR 161 from the south to the north.

The northern portion of the proposed project area has been modified by existing development near the community of Jean. Two multi-story vertical structures with lighted arcade billboards modify the existing natural landscape. Beyond these structures and a few single-story structures, mountains dominate the background.

Similar to the Jean area, brightly-colored retail facilities and multi-story casino buildings dominate the landscape in the southern portion of the proposed project area near the community of Primm. The structures dominate foreground views of motorists traveling I-15. Beyond these structures, modifications to the landscape include a new black top asphalt road to the east and the construction site of a new power generating facility. The surrounding terrain is generally flat with prominent mountains in the background. Vegetation of the natural areas outlying the development is predominantly creosote bush, white bursage, and other native desert flora.

McCullough Range

The proposed Ivanpah-Mead Transmission Line (regardless of plant site alternative) would cross the McCullough Range to the east before entering the Eldorado Valley and the existing Mead Substation. McCullough Pass is characterized as a relatively narrow to broad mountain pass that traverses the McCullough Range in an easterly-westerly direction. The western portion of the pass is rugged and narrow, with 30 percent slopes that rise from an alluvial fan above the valley floor. Creosote bush dominates the alluvial fan to the base of the pass; yucca and cholla become more common as elevation increases. The eastern portion of the pass is less rugged and broader than that of the

western portion of the pass with a landform that gradually descends to the Eldorado Valley, a distance of approximately 4 miles. Numerous ephemeral washes (arroyos) traverse the eastern portion of the pass before entering an alluvial fan and the Eldorado Valley. Yucca and cholla gradually become less abundant and are replaced by creosote bush and vegetation that is typical of a valley floor.

Eldorado Valley

The proposed Ivanpah-Mead Transmission Line would enter Eldorado Valley from the western slopes of the McCullough Range; traverse the valley floor in a northeasterly direction before terminating at the Mead Substation, south of Boulder City. The Eldorado Valley is bordered by the McCullough Range to the west and the Eldorado Mountains to the east. Topography in the Eldorado Valley ranges from about 1,700 feet amsl in the valley to about 7,026 feet amsl in the McCullough Range to the southwest. The terrain is characterized as relatively flat with a large dry lakebed located in the western portion of the valley floor. The mountains bordering the northern edge of the valley floor are vegetated primarily with desert scrub-brush creating a textured appearance to the background. Black lava beds contrast the mountain earth tones of browns, greens, and grays. Vegetation in the valley consists of desert scrub-brush dominated by creosote bush.

Similar to the Ivanpah Valley, there are numerous above and belowground utilities present throughout the Eldorado Valley including high voltage transmission and distribution lines. The landscape in the western portion of the valley has been modified with the presence of the Eldorado Generating Facility and three substations. U.S. 95, a two-lane black top highway, runs the entire length of the Eldorado Valley north to south and is a well-traveled roadway through this area.

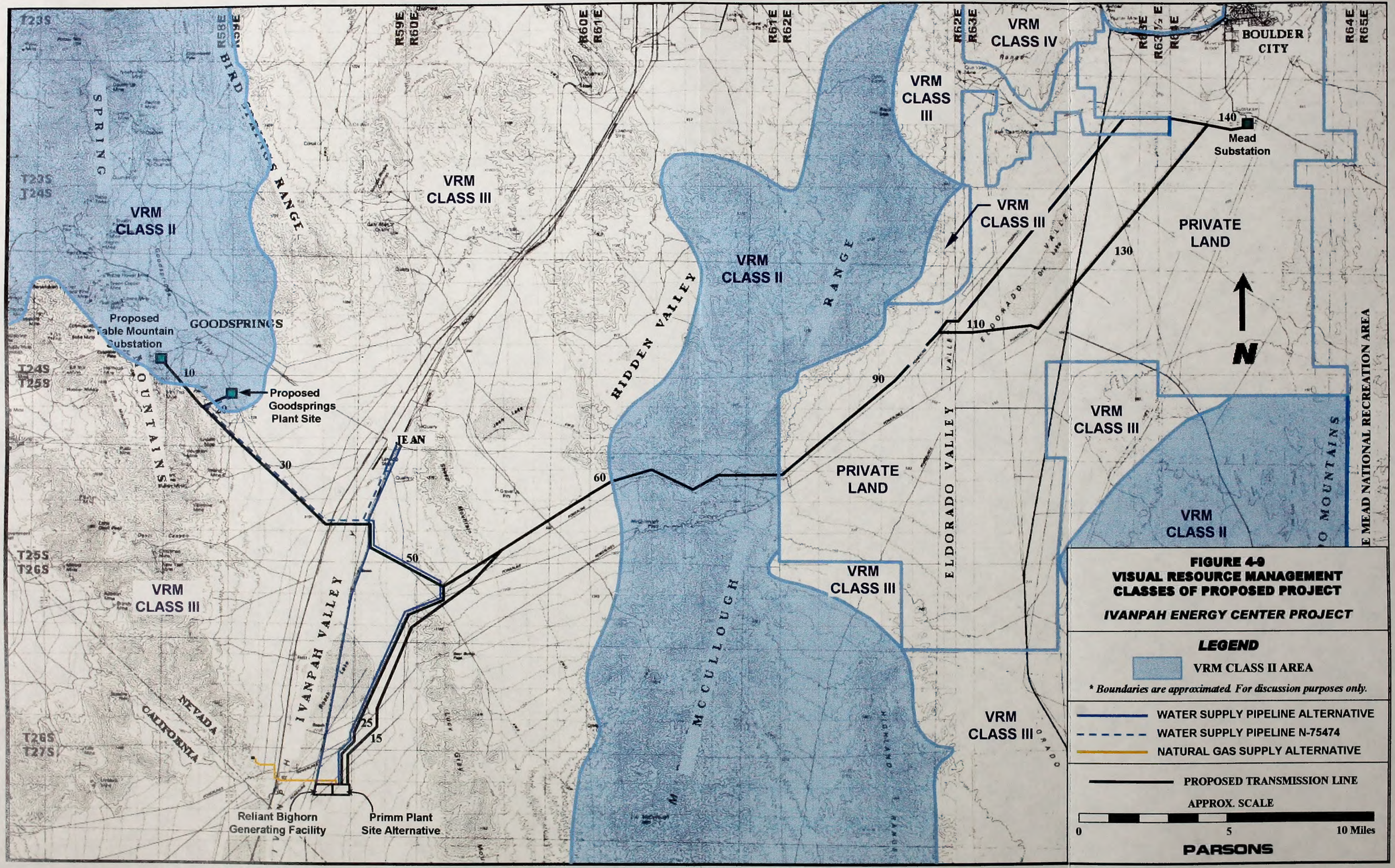
Southwest Gas Company operates a natural gas transmission pipeline in Eldorado Valley. The pipeline extends primarily along the west side of U.S. 95, in a north/south orientation. Sempra Energy is planning to construct a new natural gas pipeline from the vicinity of the KRGT Goodsprings Compressor Station, through the McCullough Range to Eldorado Valley.

4.11.2 BLM VRM Classifications

Visual Resource Management (VRM) Classes establish guidelines for determining visual values and management objectives to visual resources on public land. Classes are determined by evaluating three factors: scenic quality, viewer sensitivity, and distance zones as previously described in Section 4.11. Class I and Class II are most valued, Class III is moderately valued, and Class IV is the least valued. Based on an evaluation of the above factors, VRM Classes for the proposed project and alternatives were assigned by the BLM in the development of BLM's *Las Vegas RMP* (BLM 1998).

According to BLM's *Las Vegas RMP*, the proposed project and alternatives would be located within two VRM Classes, Class II and Class III. The area of the proposed Goodsprings Plant Site and a portion of the transmission line that crosses the McCullough Range are located within a VRM Class II area (Figure 4-8). The management objective of a Class II area is to retain the existing character of the landscape by allowing a low level of

change. Management direction of a Class II area (VS-1-a) is stated in the RMP as "...authorized actions may not modify existing landscapes or attract the attention of casual viewers." Water supply pipelines and transmission lines that are located within the Ivanpah Valley floor are within a VRM Class III area (Figure 4-9). The Primm Plant Site also is within a Class III area. The management objective of a Class III area is to partially retain the existing character of the landscape by allowing a moderate level of change. Management direction of a Class III area (VS-1-b) is stated in the RMP as "...authorized actions may alter the existing landscape, but not to the extent that they attract or focus attention of the casual viewer."


VRM CLASS II
VRM CLASS III
VRM CLASS IV
PRIVATE LAND
BOULDER CITY
Mead Substation
140
130
110
90
60
50
30
25
15
10
Proposed Table Mountain Substation
Proposed Goodsprings Plant Site
GOODSPRINGS
JEAN
Reliant Bighorn Generating Facility
Primm Plant Site Alternative
SPRING MOUNTAINS
BIRD SPRINGS RANGE
HIDDEN VALLEY
ELDORADO VALLEY
McCULLOUGH RANGE
IVANPAH VALLEY
NEVADA
CALIFORNIA
T23S
T24S
T25S
T26S
T27S
R58E
R59E
R60E
R61E
R62E
R63E
R64E
R65E
N
FIGURE 4-9
VISUAL RESOURCE MANAGEMENT CLASSES OF PROPOSED PROJECT
IVANPAH ENERGY CENTER PROJECT
LEGEND
VRM CLASS II AREA
* Boundaries are approximated. For discussion purposes only.
WATER SUPPLY PIPELINE ALTERNATIVE
WATER SUPPLY PIPELINE N-75474
NATURAL GAS SUPPLY ALTERNATIVE
PROPOSED TRANSMISSION LINE
APPROX. SCALE
0
5
10 Miles
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4.12 CLIMATE AND AIR QUALITY

4.12.1 CLIMATE AND METEOROLOGY

The overall climate of Clark County is classified as desert and is characterized by sunny days, low annual precipitation, dry air, and a large range in daily temperature. This desert climate is caused by low altitude, its southerly location, and by the surrounding topography. The Ivanpah Valley is located at the edge of the Mojave Desert and experiences an arid climate, typical of the southern Mojave Desert. Storms originating in the Pacific Ocean rarely reach the Valley due to the Sierra Nevada Range and Spring Mountains to the west. Annual average precipitation is 4.13 inches and is distributed fairly uniformly throughout the year. Dry air masses move over the Valley, resulting in clear to partly cloudy skies with 85 percent of the days in an average year with sunshine.

Surface meteorology is generally characterized by monthly average wind speeds ranging from 7 to 11 miles per hour (mph). Lower wind speeds are prevalent during the winter months with a windy season throughout most of the spring. Winds in excess of 40 miles per hour are infrequent. During these infrequent periods, blowing sand and dust are prevalent. In addition to the prevailing winds, a pattern of local winds, generated by the local topography and temperature, also affect the Valley. During the day, as the air mass is heated, wind directions are generally upslope and in a westerly direction. At night, the wind direction is reversed and cool air drawn from the higher elevations drains to the lower areas of the Valley.

The dispersion of air pollutants is dependent on atmospheric stability and the mixing height. Atmospheric stability is the degree of mixing due to wind speed and surface heating turbulence. Stable atmospheric conditions restrict dispersion and can cause high pollutant concentrations near the ground. Unstable atmospheric conditions enhance dispersion and act to lower pollutant concentrations near the surface. The mixing height is the atmospheric layer where wind speed and surface heat mix. Low mixing heights associated with low-level temperature inversions (a stable layer in the atmosphere where the ambient temperature uncharacteristically increases with height) act as a cap, trapping pollutants and can cause high ground-level air pollutant concentrations.

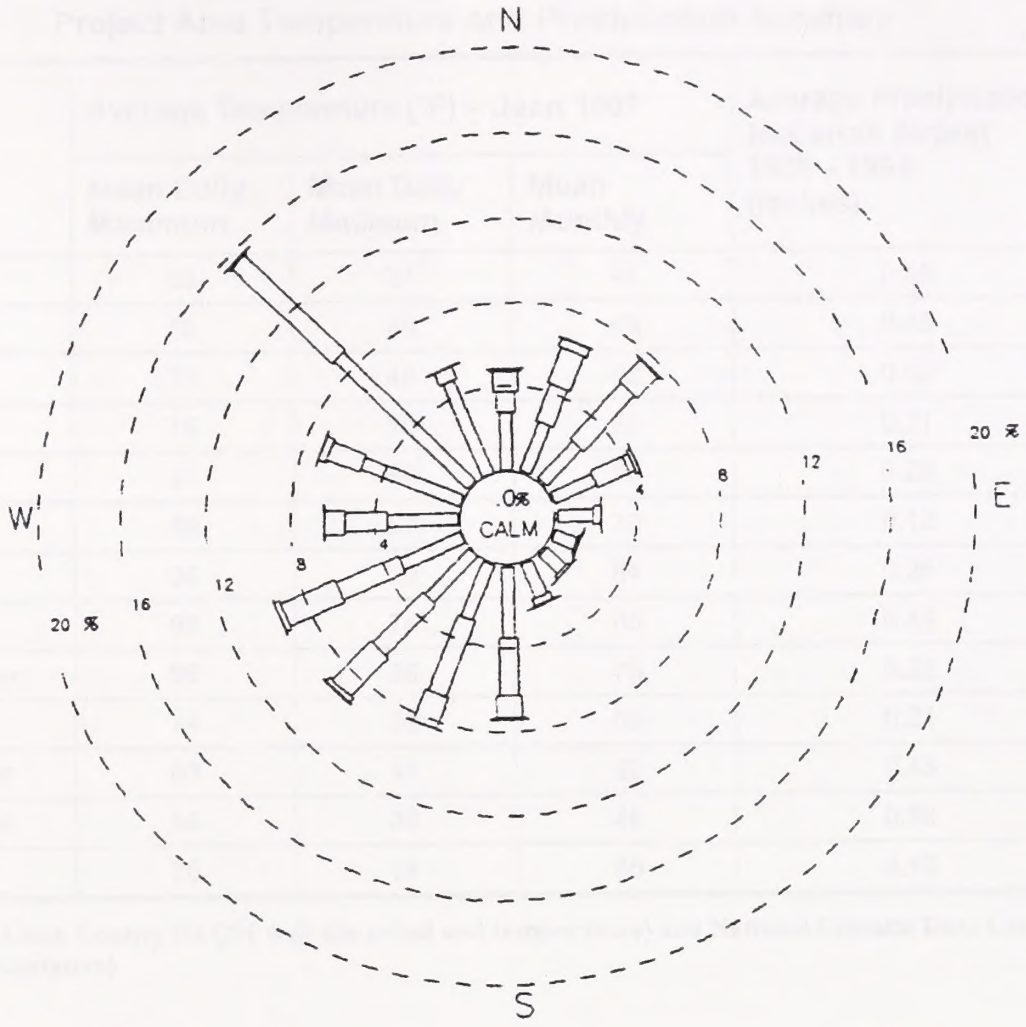
Stable atmospheric conditions can occur throughout the year in Clark County, but tend to occur in the morning hours during November and December. Low mixing heights most frequently occur during the winter, but may occur in the morning at any time of the year. The morning stable conditions and the low mixing heights can coincide with peak vehicle traffic, producing relatively high pollutant concentrations in high traffic areas. Increased dispersion during the afternoon acts to lower concentration levels.

Wind and temperature data for 1997 from the Jean monitoring station were available from the Clark County Department of Air Quality Management (DAQM) at its Internet web site. Jean is about five miles east of the Proposed Goodsprings generating facility site and

12 miles north of the Primm Plant Site Alternative. Although a longer term period of wind and temperature data is available from McCarran Airport about 20 miles to the northeast, the Jean data were considered more representative of site conditions due to proximity and better similarity in elevation. Applicable elevations above sea level are approximately: Proposed Goodsprings site – 3,365 ft; Primm Site Alternative – 2,790 ft; Jean – 2,900 ft.; and McCarran Airport – 2,200 ft. In addition, precipitation data from McCarran Airport, for 1950 through 1994, were available from the National Climatic Center (1995), but not from the Jean site. Data from Jean and McCarran Airport are used to describe meteoro-logical conditions in the project area.

Figure 4-10 is a wind frequency distribution, or wind rose, of the 1997 Jean wind data. The Jean data indicate that northwesterly winds are the most frequent. This appears to be indicative of nighttime drainage winds being funneled down from the Goodsprings Valley, which is to the northwest of Jean, is oriented generally northwest to southeast, and drops in elevation towards Jean. The average wind speed for this direction is about 6 mph. Given the similar northwest to southeast orien-tation of the minor valley in which the Goodsprings Plant Site is located, and its alignment with the Goodsprings Valley, this nighttime northwesterly winds can be expected to also occur with high frequency at the site. The Jean data indicate that the northwesterly winds are nearly absent during the day. Similar nighttime winds are expected at the Primm Plant Site due to the presence of surrounding mountains.

Mean monthly and annual temperatures and precipitation are shown in Table 4-13 for the periods indicated. Monthly average temperatures in 1997 ranged from a minimum of 45°F in December and January to a maximum of 86°F in August. Average daily minimum temperatures were at their lowest in December (36°F) and average daily maximum temperatures were at their highest in August (97°F). The annual average temperature was 65°F. Temperatures can be expected to vary somewhat from these 1997 averages from year-to-year. Site temperatures may be slightly lower than in Jean due to the approximately 500 feet elevation difference. Precipitation averages about 4 inches per year at McCarran Airport and is distributed relatively evenly throughout the year, but winter rainfall is higher than in summer. Rainfall at the site may be somewhat greater than at McCarran Airport due to the higher site elevation (2,790 to 3,365 ft. vs. 2,200 ft) and the mountains to the west of the site. Mountains can cause increased rainfall due to orographic effects.



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FIGURE 4-10
ANNUAL WIND ROSE (1997)
JEAN MONITORING STATION

Table 4-13
Project Area Temperature and Precipitation Summary

Month	Average Temperature (°F) – Jean 1997			Average Precipitation McCarran Airport 1950 – 1994 (inches)
	Mean Daily Maximum	Mean Daily Minimum	Mean Monthly	
January	53	37	45	0.48
February	58	39	48	0.48
March	77	49	62	0.42
April	75	50	63	0.21
May	91	66	79	0.28
June	89	67	79	0.12
July	95	70	84	0.35
August	97	74	86	0.49
September	86	66	76	0.28
October	74	52	63	0.21
November	63	43	52	0.43
December	55	36	45	0.38
Annual	76	54	65	4.13

Sources: Clark County DAQM web site (wind and temperature) and National Climatic Data Center, 1995 (precipitation)

4.12.2 AIR QUALITY STANDARDS

The Federal government, through the United States Environmental Protection Agency (EPA), has established primary and secondary National Ambient Air Quality Standards (NAAQS). There are federal ambient air quality standards for criteria pollutants, which include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), suspended particulate matter less than 10 microns in diameter (PM_{10}), sulfur dioxide (SO_2), and lead (Pb). National primary air quality standards are established at the levels necessary, with an adequate margin of safety, to protect public health. Similarly, national secondary ambient air quality standards specify the levels of air pollution determined appropriate to protect the public welfare from any known or anticipated adverse effect associated with air contaminants. The EPA, State of Nevada, and the Clark County Department of Air Quality Management (DAQM) are responsible for enforcing the ambient air quality standards in Clark County. The State of Nevada has adopted the federal ambient air quality standards. However, in some

cases, the DAQM has established stricter ambient air quality standards for Clark County. The federal, state, and Clark County standards are shown on Table 4-14.

4.12.3 BASELINE AIR QUALITY

Air quality at a given location is described by the concentration of various criteria pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The severity of a pollutant concentration is determined by comparing it with the federal, state, and local primary and secondary ambient air quality standards. Maximum pollutant concentrations measured at the Jean monitoring station from 1996 through 2000 are used to characterize the baseline air quality of the project site. The DAQM administers the monitoring program.

Criteria Pollutants

The following provides a discussion of the criteria pollutants monitored at the Jean monitoring station or elsewhere in Clark County. Table 4-15 provides a summary of the monitoring data over the past several years.

Ozone

Ozone is a bluish or colorless gas that is formed in the atmosphere by a photochemical reaction between NO_X (oxides of nitrogen) and volatile organic compounds (VOCs). Motor vehicles are the major source of NO_X and VOCs in the Ivanpah Valley. The common manifestations of ozone are damage to vegetation and cracking of untreated rubber. Ozone in high concentrations can also directly affect the lungs, causing respiratory irritation and possible changes in lung functions.

The two forms of nitrogen oxides (NO_X) that are important in air pollution are nitric oxide (NO) and NO_2. Nitrogen dioxide is a reddish-brown gas with an irritating odor and can cause lung tissue damage. High combustion temperatures cause nitrogen and oxygen to combine and form nitric oxide. Further reaction of NO with oxygen produces NO_2. Combustion in motor vehicle engines is the primary source of NO_X in the Valley.

Sulfur Dioxide

Sulfur dioxide is a colorless, pungent, irritating gas produced primarily by the combustion of sulfur-containing fossil fuels. At sufficiently high concentrations, SO_2 irritates the upper respiratory tract. At lower concentrations, when in combination with particulate, SO_2 can injure lung tissues. Sulfur oxides (SO_X), in combination with moisture and oxygen, can yellow the leaves of plants, dissolve marble, and erode iron and steel. Sulfur oxide can also react to produce sulfates, which reduce visibility and cut down the light from the sun.

Carbon Monoxide

Carbon monoxide is a clear, odorless, toxic gas produced by internal combustion engines and incomplete combustion of carbon-containing substances. The natural degradation of plant matter can also produce some CO, but gasoline-powered motor vehicles are the major source of this contaminant in the Valley. The highest ambient CO concentrations usually occur near congested transportation arteries and

Table 4-14
Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	Ambient Air Quality Standards					
		Clark County		Nevada		Federal	
		$\mu g/m^3$	ppm	$\mu g/m^3$	ppm	$\mu g/m^3$	ppm
Sulfur dioxide	AAM	60	0.02	80	0.03	80	0.03
	24-hour	260	0.1	365	0.14	365	0.14
	3-hour	1,300	0.5	1,300	0.50	1,300	0.50
Carbon monoxide	8-hour	10,000	9.0	10,000	9.0	10,000	9.0
	1-hour	40,000	35.0	40,000	35.0	40,000	35.0
Ozone	1-hour	235	0.12	235	0.12	235	0.12
	8-hour	--	--	--	--	157	0.08
Nitrogen dioxide	AAM	100	0.05	100	0.05	100	0.05
$PM_{2.5}$	AAM	--	--	--	--	15	--
	24-hour	--	--	--	--	65	--
Inhalable particulate	AAM	50	--	50/150	--	50	--
	24-hour	150	--	--	--	150	--

ppm: parts per million
$\mu g/m^3$: micrograms per cubic meter
AAM: annual arithmetic mean

Table 4-15

Ambient Air Quality Concentrations at the Jean Monitoring Station (concentrations in ppm)

Pollutant	Averaging Period	Year		
		1998*	1999	2000
Carbon monoxide (ppm) [a]	8-hour	--	--	--
	1-hour	--	--	--
Ozone (ppm)	1-hour	-- [b]	0.095	0.091
Nitrogen dioxide (ppm)	Annual	-- [b]	0.0042	0.0025
	1-Hour	-- [b]	0.071	0.042
Inhalable particulates (PM_{10}) ($\mu g/m^{3)}$	Annual	13.0	12.30	10.31
	24-hour	43.0	59.0 +	38.71
Sulfur Dioxide (ppm) [c]	Annual	--	--	--
	24-Hour	--	--	--
	3-Hour	--	--	--

Note:
[a] – Carbon monoxide is not monitored at the Jean monitoring station.
[b] – Jean Station did not start monitor these pollutants until 1999
[c] – Sulfur dioxide is not monitored at the Jean monitoring station.
Source: Clark County DAQM web site
ppm: parts per million
$\mu g/m^3$: micrograms per cubic meter
* Per July 1999 SLAMS Report

intersections. CO is not a respiratory tract irritant, but instead passes through the lungs and interferes with the transfer of oxygen in the blood. The symptoms of excess exposure include dizziness, headache, and loss of consciousness. CO is not known to have any adverse effects on vegetation, visibility, or materials.

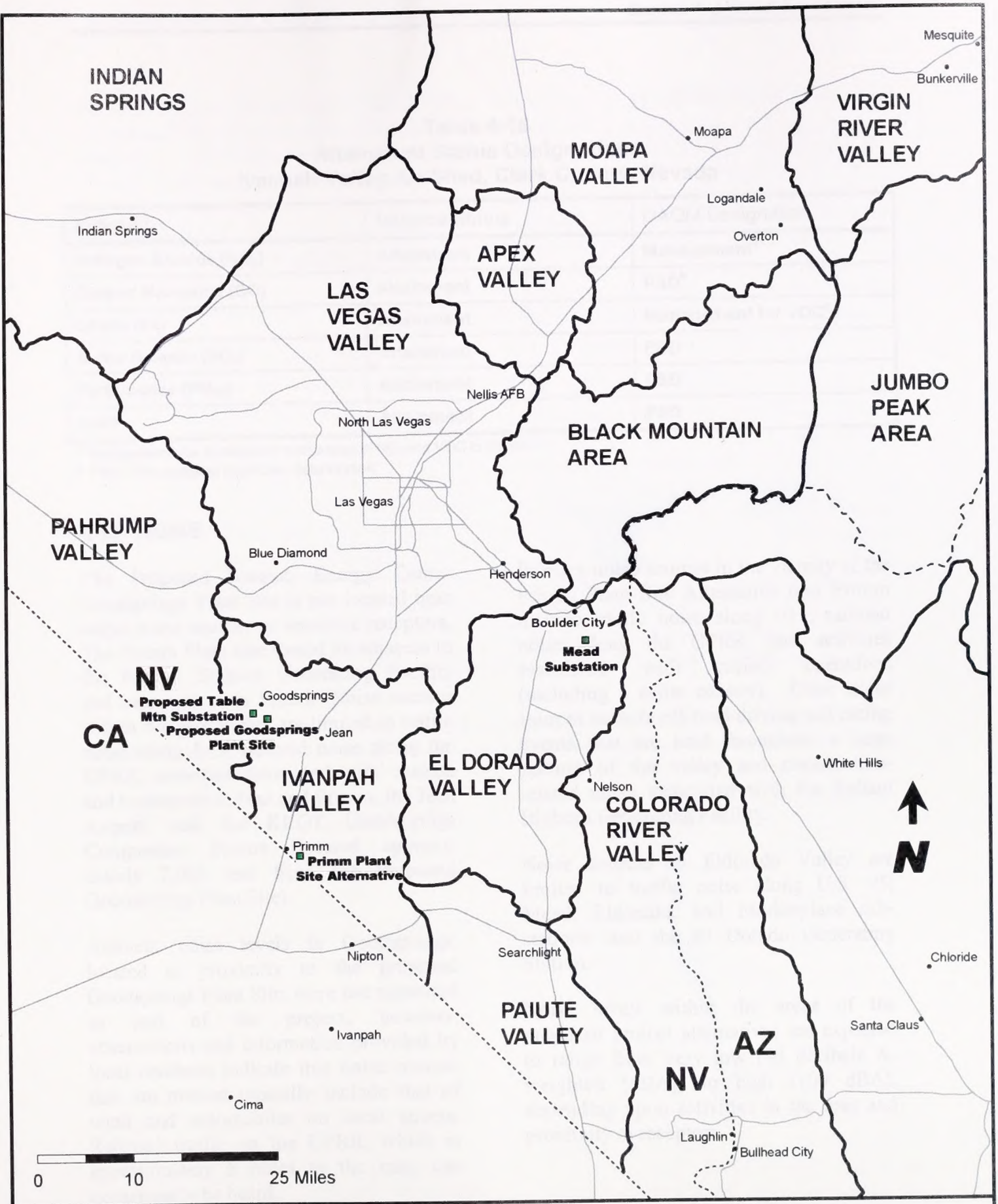
Particulate Matter

Particulate matter is made up of finely divided solids and liquids such as soot, dust, fume, and mists. PM_{10} is produced by a wide range of activities including combustion of fossil fuel, construction activities, wood-burning fireplaces, vehicular traffic, and natural wind erosion, which originates from dry lakebeds south of the Valley. PM_{10} can pass through the bronchial passages in the lung and into the alveoli where they can be retained and could damage the respiratory tract. In addition, gases absorbed on particulate matter can be absorbed by the blood stream, transported to other organs, and cause damage.

4.12.4 AIR SHEDS

The DAQM has defined thirteen separate air sheds in Clark County for purposes of air quality management. On the basis of available air quality data, all areas of Nevada are designated as either attainment, nonattainment, or unclassified relative to each of the six national criteria pollutants. This designation is referred to as "attainment status." Attainment indicates that standards are achieved continuously. Nonattainment indicates that standards are exceeded, even if for only a few times per year. Unclassified indicates that insufficient data are available to make a determination. Regulatory requirements differ in some cases depending on the attainment status. Unclassified areas are generally treated the same as attainment areas for regulatory purposes. The Ivanpah Valley air shed, in which the project site is located (Figure 4-11), is designated attainment for all criteria pollutants as shown in Table 4-16.

The DAQM's Prevention of Significant Deterioration (PSD) requirements also require BACT for each pollutant emitted in greater than certain threshold amounts. In addition, air quality modeling is required to ensure that the new project would not interfere with air quality standards. Emission offsets are not required for PSD pollutants, unless the pollutant is also a precursor for a non-attainment pollutant.



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FIGURE 4-11
AIR SHED MAP

Table 4-16
Attainment Status Designations
Ivanpah Valley Air Shed, Clark County, Nevada

Pollutant	National Status	DAQM Designation
Nitrogen Dioxide (NO_2)	**Attainment**	**Management[a]**
Carbon Monoxide (CO)	**Attainment**	**PSD[b]**
Ozone (O_3)	**Attainment**	**Management for VOC[a]**
Sulfur Dioxide (SO_2)	**Attainment**	**PSD**
Particulates (PM_{10})	**Attainment**	**PSD**
Lead	**Attainment**	**PSD**

[a] Management due to precursor relationship of NO_X and VOC to Ozone
[b] PSD – Prevention of Significant Deterioration

4.13 NOISE

The Proposed Ivanpah Energy Center Goodsprings Plant Site is not located near major noise sources or sensitive receptors. The Primm Plant Site would be adjacent to the Reliant Bighorn Generating Facility and near casinos in Primm. Noise sources within Ivanpah Valley are limited to traffic noise along I-15, railroad noise along the UPRR, activities associated with casinos and businesses in Jean and Primm, the Jean Airport, and the KRGT Goodsprings Compressor Station (located approximately 2,000 feet from the Proposed Goodsprings Plant Site).

Ambient noise levels in Goodsprings, located in proximity to the proposed Goodsprings Plant Site, were not measured as part of the project; however, observations and information provided by local residents indicate that noise sources that are present typically include that of wind and automobiles on local streets. Railroad traffic on the UPRR, which is approximately 6 miles to the east, can occasionally be heard.

Primary noise sources in the vicinity of the Primm Plant Site Alternative near Primm include traffic noise along I-15, railroad noise along the UPRR, and activities associated with casino operations (including a roller coaster). Other noise sources include off-road driving and racing events that are held throughout a large portion of the valley and construction-related noise associated with the Reliant Bighorn Generating Facility.

Noise sources in Eldorado Valley are limited to traffic noise along U.S. 95; Mead, Eldorado, and Marketplace substations; and the El Dorado Generating Station.

Noise levels within the areas of the proposed project alternatives are expected to range from very low (40 decibels A-weighted [dBA]) to high (100 dBA), depending upon activities in the area and proximity to receptors.

4.14 SOCIOECONOMICS

The proposed project alternatives are located in a sparsely populated region in Southern Clark County. Development is clustered along I-15 in Ivanpah Valley, south of the Las Vegas metropolitan area in Goodsprings, Sandy Valley, Jean, and Primm, where casinos, recreational services, retail establishments and the Jean and Sandy Valley airports are located.

The nearest populated area to the Goodsprings Plant Site is the community of Goodsprings, about 2.3 miles northwest of the project site; the nearest residence is about 2.25 miles to the northwest. The community of Jean is about 5 miles east of the plant site.

Permanent residential areas are not present in the vicinity of the Primm Plant Site; however, temporary housing for casino employees is approximately 1.5 miles to the west. Boulder City is the nearest populated area to the proposed project in Eldorado Valley where the proposed Ivanpah-Mead Transmission Line would interconnect with the Mead Substation.

4.14.1 Population

Clark County, Nevada had the fastest growing population in the United States during the 1990s. Clark County's population increased from 463,087 in 1980 to 741,459 in 1990, a 60 percent increase (Table 4-12). In 2000, the county's population was 1,375,765, an 85 percent increase from 1990 to 2000. By comparison, the state of Nevada's population increased by 50 percent from 1980 to 1990 and by 66 percent from 1990 to 2000. The State's high population increases are due to the fact that Clark County's population makes up most of the state's population, 69 percent in 2000 (Table 4-17).

Table 4-17 Historical Population Data

Communities	1980[1]	1990[1]	Percent Change 1980-1990	2000[2]	Percent Change 1990-2000
Clark County	463,087	741,459	60.1%	1,375,765	85.5%
State of Nevada	800,493	1,201,833	50.1%	1,998,257	66.3%
United States	226,542,199	281,421,906	9.8%	281,421,906	13.2%

Source: Clark County 2001 and U.S. Census Bureau 2000.
1Clark County 2001.
2U.S. Census Bureau 2000.

The communities of Goodsprings, Sandy Valley, Jean, and Primm are in the vicinity of the proposed project alternatives. The 2000 Census estimates that the population of Goodsprings is 232, and the population of Sandy Valley is 1,804. Jean and Primm are unincorporated areas. There is no housing within Jean, and the only permanent population is that of the Southern Nevada Correctional Center, with a population of approximately 660 at full capacity (PBS&J, 2002). Likewise, there is no permanent population in Primm; however, there are approximately 500 temporary housing units for casino employees located approximately 1.5 miles

from the Primm Plant Site (Lane, 2002). Although 2000 census data do not provide population numbers for Primm, Clark County Comprehensive Planning Department information indicates that 260 individuals live in the area. Demographic data pertaining to the estimated population were not available. The City of Boulder City has an estimated year 2000 population of 15,519 (Nevada State Demographer, 2002). Population numbers for Clark County, area communities, and the State are shown in Table 4-18.

Table 4-18 Populations of Area Communities (2000)

Communities	2000
Clark County[1]	1,375,765
Las Vegas MSA[2]	808,754
Goodsprings[1]	232
Sandy Valley[1]	1,804
Jean[2]	~660
Boulder City[3]	15,519
State of Nevada[1]	1,998,257

Source: U.S. Census Bureau 2000 and Clark County 2000.
[1] U.S. Census Bureau 2000.
[2] Clark County 2000.
[3] Nevada State Demographer 2000.

The racial composition of the communities of Goodsprings and Sandy Valley is presented in Table 4-19. In the community of Goodsprings the racial total is 247, and in Sandy Valley the total is 1,839. The largest racial category in Goodsprings, at 223 people equals 90.2 percent, is the "White, or with one or more other race" category. As well, in the community of Sandy Valley the largest racial group is also the "White, or with one or more other race" category, representing 92.6 percent, or 1,703 people.

Table 4-19 Census 2000 Total Races of Project's Closest Area Communities: Goodsprings and Sandy Valley, NV

Race Category	Goodsprings		Sandy Valley	
	Number	%	Number	%
Total Races Tallied*	247	100%	1,839	100%
White, or with one or more other race	223	90.2%	1,703	92.6%
Black, or African American, or in combination with other race	4	1.6%	29	1.57%
American Indian/Alaska Native, or combination	10	4%	21	1.14%
Native Hawaiian/Pacific Islander or combination	4	1.6%	1	.05%

Race Category	Goodsprings		Sandy Valley	
	Number	%	Number	%
Asia alone, or in combination with other race	0	0	19	1.03%
Some other race alone, or combination with other race	6	2.4%	66	3.58%

Source: U.S. Census Bureau 2000 ***Total Races do not equal total population**

The largest age group of the population in both Goodsprings and Sandy Valley is the age 18 to 64 years group for both male and females, at 26.3 and 28.4 percent, respectively, in Goodsprings, and 32.2 and 30.9 percent in Sandy Valley. While the age group below 5 years between two and three percent is similar in the two communities, the population over 65 years in Goodsprings is substantially at a higher percentage ---31.5 percent--- for both male and females than for the same age group in Sandy Valley, which is at 11.9 percent. Age and gender data for Goodsprings and Sandy Valley are provided in Table 4-20.

Table 4-20 2000 Population Distribution by Age and Gender in Goodsprings and Sandy Valley, NV

Category	Goodsprings		Sandy Valley	
	Number	%	Number	%
Total Population	232	100%	1,804	100%
Male – total	110	47.4%	908	50.3%
Male Under 5 years	3	1.3%	40	2.2%
Male 5+ to 17 years	15	6.5%	171	9.5%
Male 18 to 64 years	61	26.3%	580	32.2%
Male over 65+	31	13.4%	117	6.4%
Female – total	122	52.6%	896	49.7%
Female Under 5 years	9	3.9%	53	2.9%
Female 5+ to 17 years	26	11.2%	188	10.4%
Female 18 to 64 years	66	28.4%	558	30.9%
Female over 65+	21	9.1%	97	5.4%

Source: U.S. Census Bureau 2000

Population projections for the State of Nevada and Clark County estimate a 22 percent increase (Table 4-14) between 2005 and 2015. The primary cause of the recent population surge is increased economic opportunity in the Las Vegas metro area. Construction continues to employ a very large workforce, and hotel and casino employment continues to grow. In addition, many of the new residents in the Las Vegas metropolitan area are retired (UNLV, 2001). Population projection data for Clark County, Goodsprings, and Sandy Valley are provided in Table 4-21.

Table 4-21 Population Projections

Location	2000	2005	2010	2015	% Growth 2005-2015
[1]Clark County	1,375,765	1,738,111	1,945,409	2,120,940	22%
[1] State of Nevada	1,998,257	2,402,097	2,611,453	2,950,942	22.8%
[2]Goodsprings	232	278	302	339	22%
[2]Sandy Valley	1,804	2,165	2,353	2,641	22%

Source: [1] Clark County 2001. [2] 2000 U.S. Census for year 2000 and projection using growth rates for the State of Nevada

4.14.2 Employment

The largest employment sectors (nongovernmental sectors) in Clark County in terms of the number of employees are services, retail trade, construction, and finance/insurance/real estate. Federal, State, and local governments are important employers in the area, and important components of the local economy. Table 4-22 shows employment, total payroll, and average annual wages by industry for Clark County.

Table 4-22 2002 Employment for Clark County, Nevada

Industry Sector	Average Annual Employment	Total Payroll	Average Annual Wages
Total Employment (all industry sectors)	697,499	$22,407,609,208	$32,126
Mining	670	$30,121,105	$32,126
Construction	64,848	$2,556,433,462	$39,422
Manufacturing	20,889	$787,374,915	$37,693
Durable Goods	11,309	$455,261,454	$10,257
Non-Durable Goods	9,580	$332,113,461	$34,667
Trans., Comm., & Utilities	39,224	$1,399,894,521	$35,690
Trade	146,242	$3,550,850,890	$24,281
Wholesale	21,662	$924,328,695	$42,671
Retail	124,580	$2,626,522,195	$21,083
Finance, Insurance and Real Estate	34,046	$1,380,309,433	$40,542
Services	315,589	$9,770,922,397	$30,961
Hotels, Gaming and Recreation	189,896	$5,571,932,869	$29,342
Government	68,958	$2,769,076,579	$40,141

Source: Nevada Department of Employment, Training, and Rehabilitation 2002.

The ten largest employers in Clark County in September 2001 were as follows (number of employees provided parenthetically): Clark County School District (22,900 – 22,999), Nellis Air Force Base (10,000 – 10,099), Bellagio Hotel and Casino (8,700-8,799), Clark County (8,200-8,299), MGM Grand Hotel (8,200-8,299), Bally's and Paris Casino Hotel (7,600-7,699), Mirage Hotel and Casino (6,500-6,599), Mandalay Bay Resort Casino (5,700-5,799), Caesar's Palace Hotel and Casino (5,000-5,099), State of Nevada, one of multiple sites (4,800-4,899) (State of Nevada Department of Employment, Training, and Rehabilitation, Clark County Top 50 Employers, 2001).

In January 2002 the unemployment rate for Clark County was 6.8 percent, up from 4.7 percent the previous year (UNLV, 2002). Per capita personal income in 2000 was $32,126 (State of Nevada Department of Employment, Training, and Rehabilitation, 2002).

4.14.3 Income and Poverty

Income and poverty figures for Clark County and the City of Las Vegas, obtained from the 2000 U.S. Census provide an overview of the economy of the greater-project area. 2000 Census data depicting income and poverty figures for Goodsprings and Sandy Valley are not yet available. Additionally, there are no 1990 – 2000 comparative U.S. Census data for the Goodsprings or Sandy Valley communities, as 1990 census data was not derived for either of the communities at that time.

Table 4-23 provides income and poverty data derived from 2000 census data for Clark County and Las Vegas, the expected population base for construction and operation employees of the proposed IEC project.

Only 8.5 percent of families in the City of Las Vegas and 6.9 percent of the city's population live below the poverty line. In Clark County, which includes Las Vegas, the respective percentages for families and population are 7.8 and 10.6.

The City of Las Vegas represents approximately 35 percent of the total families and total households in Clark County. Las Vegas also has approximately 38 percent of the families and individuals living below the poverty line in Clark County.

Table 4-23 2000 Income and Poverty – Las Vegas and Clark County, Nevada

Income and Poverty Characteristics	Las Vegas		Clark County		Las Vegas as % of County
Total Number of Families	118,540		342,405		35%
Families below Poverty line in 1999	10,166	8.5%	26,866	7.8%	38%
Total Population	808,754		1,375,765		58.7%
Individuals below Poverty line in 1999	56,053	6.9%	145,855	10.6%	38%
Number of Households	177,223		512,714		35%
Median Household Income	$44,069		$44,616		98.7%
Median Family Income	$50,465		$50,485		99.9%

Source: 2000 U.S. Census

4.14.4 Housing

The 2000 Census reported that there are 559,799 housing units in Clark County. The homeowner vacancy rate was 2.6 percent and the rental vacancy rate was 9.7 percent (2000 Census). The median new home sold for $181,170 in February 2002, or 10.97 percent more than February 2001. The median price for an existing home was $140,000 in February 2002, or 3.7 percent higher than February 2001 (UNLV, 2002). The average monthly rent for an apartment in Clark County was $712 in the 4th quarter of 2001(UNLV, 2002).

In Sandy Valley, homes vary from manufactured and recreational vehicles (RVs) to custom-built single-family homes and ranchettes built on relatively large lots. Home prices vary from about $30,000 to $289,000 (PBS&J, 2002). There are about 12 homes listed for sale at any given time in Sandy Valley.

In Goodsprings approximately half of the residents live in mobile homes while the other half lives in single-family residences. Home prices vary from approximately $30,000 to $170,000 (PBS&J, 2002). There are rarely more then three homes listed each year, and are typically sold relatively quickly (PBS&J, 2002).

Housing Units and Families

The fact that over ten percent of the housing units are vacant would suggest that the proposed IEC project will not have a significant impact with respect to new home construction or permanent versus temporary population growth. Further, construction and operation personnel are expected to come from the greater Las Vegas community on a commuter basis.

Despite their relative size differential, the occupied housing units in Goodsprings (107 occupied units) and Sandy Valley (714 occupied units) are at 88 percent of the total housing units respectively in the two communities. Whereas occupancy rates are similar, there are notable differences between the two communities in terms of average family size and average household size. Goodsprings has an average of 2.17 persons per household and 2.83 people per family, while Sandy Valley has 2.53 persons per household and

3.03 people per family. Housing unit data for Goodsprings and Sandy Valley are provided in Table 4-24. There are no permanent housing units in Jean or Primm; however, there are approximately 500 temporary housing units in Primm for casino workers (Lane, 2002).

Table 4-24 Households and Families – Goodsprings and Sandy Valley (2000)

	Goodsprings	%	Sandy Valley	%
Total Housing Units	122	100%	811	100%
Housing Units Occupied	107	88%	714	88%
Housing Units Vacant	15	12%	97	12%
Average Household Size	2.17	--	2.53	--
Families	64	--	477	--
Average Family Size	2.83	--	3.03	--

Source: U.S. Census Bureau 2000

4.14.5 Schools

Clark County School District was ranked as the sixth largest school district in the country. There are 266 schools in the District, consisting of 166 elementary schools, 45 middle schools, 33 high schools, 16 alternative schools, and six special-purpose schools (Clark County School District, 2002). The Clark County District is ranked as one of the fastest-growing school districts in the country; over the past six years, 72 new schools have been opened to accommodate an average annual growth rate of just over 7 percent (Clark County School District). The Clark County 2001-2002 enrollment in grades K-12 was 244,684 (Clark County School District, 2002).

Goodsprings Elementary School is the only school is Goodsprings. Currently there are 7 students enrolled in the school, a decrease from the 21 students enrolled during the 2000-2001 school year. Goodsprings Elementary serves the communities of Goodsprings, Jean, and Primm; however, there are currently no students from either Jean or Primm enrolled. During the 2000-2001 school year, there were approximately five middle school students from Goodsprings, all of who attended Sandy Valley Middle School. During the 2000-2001 school year, there were approximately seven high school students; all attended Durango High School, located in Las Vegas (Johnson, 2001).

Sandy Valley has two schools: the Sandy Valley Elementary and Middle School and the Keystone Academy Charter School (high school). During the 2001-2002 school year, the Sandy Valley Elementary and Middle School had a total enrollment of 230 students, including 171 elementary students and 87 middle school students (PBS&J 2002). Sandy Valley Elementary serves students living in Goodsprings, Sandy Valley, and Mesquite Valley, California (Inyo and San Bernardino Counties). In 2001, approximately 30 of the students came from Mesquite Valley (PBS&J, 2002).

The Keystone Academy Charter School had a total enrollment of 40 students during the 2001-2002 school year, and is expected to grow to 125 students by the year 2004 (PBS&J, 2002). This school serves students of Mesquite Valley, California, Sandy Valley, Nevada, and Goodsprings, Nevada. Currently, most high school-aged students living in Sandy Valley attend Durango High School in Las Vegas (Sandy Valley Elementary and Middle School 2001).

The Clark County School District provides bus transportation for all students who live two or more miles from their assigned school, excluding students with zone variances. Currently, buses are used by Goodsprings Elementary School (as needed), the Sandy Valley Elementary and Middle School, and high school students living in Sandy Valley or Goodsprings who attend Durango High School. Buses serving Goodsprings Elementary School use SR 161 to transport students living along I-15 corridor from Jean south to the California border (including Primm); however, for the 2002-2003 school year, there are no school buses serving the Primm area (Cardenas, 2002). Buses serving Sandy Valley Elementary and Middle School use SR 161 to shuttle students from Goodsprings to Sandy Valley Elementary and Middle School. Also, Clark County buses transport students from Sandy Valley and Goodsprings, along SR 161 and 1-15, to Durango High School in Las Vegas. For the 2002-2003 school year, buses will use the same route to transport these students to Sierra Vista High School in Las Vegas (PBS&J, 2002).

The City of Boulder City has four schools within the Clark County School District: two elementary schools, one middle school, and one high school. During the 2000-2001 school year, enrollment for the four schools totaled approximately 2,353 students; 990 elementary students, 613 middle school students; and 750 high school students (Clark County School District, 2002). Additionally, the Community College of Southern Nevada has a campus located in Boulder City offering transferable courses in computers, general education, languages, technology, sciences, and aviation (City of Boulder City Chamber of Commerce, 2002).

4.14.6 Community Infrastructure

The town of Goodsprings is 2.5 miles northwest of the Goodsprings Plant Site. Goodsprings has a population of 232 persons and 122 households (2000 Census). Goodsprings served as a former mining and ranching town. The State of Nevada recognizes the area surrounding the town of Goodsprings as a historical mining district whose character has been incorporated into Goodsprings' identity today. Special features located in Goodsprings consist of the Pioneer Saloon, Desert Treasures gift shop, Goodsprings Elementary School (Clark Independent School District), and Goodsprings Branch Library (Las Vegas-Clark County Library District). Some forms of local income include real estate and home-based businesses. Most residents of Goodsprings work in other communities, such as the Las Vegas metropolitan area, Jean, Sloan, Primm, and Sandy Valley. Nevada Power provides electricity. Water is obtained from wells, and septic systems are used for sewage disposal.

The town of Jean is located along I-15 approximately 5 miles the Proposed Goodsprings Plant Site, at the intersection of SR 161. There are no homes or

permanent residents in the community. The town consists of two large casinos/hotels located along I-15, two small gas station/minimarts, a Nevada Welcome Center, a U.S. Post Office, the Jean Airport (Clark County Department of Aviation), the SNCC, and the Letica Corporation (manufacturing).

The Jean Airport serves Jean and Clark County and is owned by Clark County. The longest runway is paved and extends 4,600 feet. The airport is at a distance of about 1 mile from Jean.

Since there are no permanent residents of Jean, the entire workforce comes from surrounding communities. There are two hotel/casinos in the town. The Nevada Landing Hotel and Casino features 300 hotel rooms, a 35,000 square feet casino, and a restaurant. The Nevada Landing Hotel and Casino employs approximately 550 people, of which 20 percent are from Sandy Valley and Goodsprings and the other 80 percent are from the Las Vegas area. The Gold Strike Hotel and Gambling Hall, has 812 hotel rooms, a 37,000 square foot casino and restaurant and employs 650 people, of which 20 percent are from Sandy Valley and Goodsprings and 80 percent are from the Las Vegas area (PBS&J, 2002).

Nevada Power provides electricity for Jean. Water is obtained from wells, and septic systems (*i.e.* package treatment plant) are used for sewage disposal. No solid waste disposal services are available. The two casinos share a well and a private wastewater treatment plant (PBS&J, 2002).

Sandy Valley is approximately 11 miles west of the Goodsprings Plant Site. The community is sparsely developed with a combination of large-lot custom homes, ranchettes, manufactured homes, farms, a few businesses, and a few community facilities. Some local employment opportunities include farming and mining, but most residents of Sandy Valley work in Jean, Pahrump, and the Las Vegas metropolitan area (PBS&J, 2002). Employers in Sandy Valley consist of Sandy Valley Elementary/Middle School, Keystone Academy Charter School, Sandy Valley Library, two bars, a general store, two restaurants, a small private airport, and a couple of small manufacturing (agricultural products) facilities. Sandy Valley Airport is privately owned and provides services to small aircrafts. Major crops grown in the area include hay and sod. Electricity is provided by Valley Electric Association. Water is obtained from wells, and septic systems are used for sewage disposal.

Fire protection services are provided through a volunteer fire department in the community of Goodsprings and the Clark County Fire Department. Medical emergency services are available in Jean; police protection is provided by the Las Vegas Metropolitan Police Department.

The community of Primm is located south of Jean, at the intersection of I-15 and Wells Road near the Nevada/California state border, approximately 1.5 miles west of the proposed Primm Plant Site. Primm consists of three hotel/casinos, a retail outlet mall, a service station, and several restaurants. Buffalo Bill's Resort and Casino, Primm Valley Resort Casino, and the Fashion Outlet Mall on located east of I-15. Whiskey Pete's Casino and Hotel is located west of the interstate. The Reliant Bighorn Generating Facility (currently under construction) is located approximately 1.5 miles east of Primm on Wells

Road. There are no homes or permanent residents in the community.

Nevada Power provides electricity for Primm and water is obtained from wells. Fire protection in the area is provided by the Clark County Fire Department; emergency medical services are available in Jean. The Las Vegas Metropolitan Police Department provides police protection (Necas, 2002).

The City of Boulder City is located north of the Mead Substation, in Eldorado Valley. Historically, the City was created to house workers during construction of Hoover Dam. When Hoover Dam was complete, the community became head-quarters to government agencies such as the U.S. Bureau of Reclamation and the National Park Service. Local employment opportunities primarily are related to recreation and tourism because of its proximity to Hoover Dam and the Lake Mead National Recreation Area. A variety of retail establishments including boutique shops, art galleries, as well as services such as restaurants and lodging offer additional employment. Boulder City is listed on the National Register of Historic Places as the first "planned community" in America and is home to the historic Boulder Dam Hotel. The City of Boulder City has a hospital, library, and a municipal airport, which provides aviation services to both commercial and private aircraft. All utility services including electric, water, sewer, and refuse collection are provided to residents and businesses by the City (City of Boulder City, 2002).

4.14.7 Tax Base and Tax Revenue

The Clark County sales tax rate is 7.25 percent that is comprised of a combination of several taxes based on Nevada Statues.

All counties in Nevada charge the following taxes:

- Sales Tax-General Fund (2.00%)
- Local School Support Tax (2.25%)
- Basic City Council Relief Tax (0.50%) and
- Supplemental City Council Relief Tax (1.75%).

Clark County charges the following additional taxes:

- Public Mass Transportation and Construction of Roads (0.25%),
- Control of Floods (0.25%), and
- Infrastructure (0.25%) (Nevada Department of Taxation, 2001).

There is no sales tax on food items used for home consumption or prescribed medical goods (Nevada Department of Taxation, 2001).

Gasoline is taxed at 23 cents per gallon and there is also a motor vehicle tax where the valuation of the vehicle is determined at 35 percent of the manufacturer's suggested retail price, without accessories. Vehicle value is depreciated to 85 percent after the first year and graduated down to 5 percent after 9 years. Gross gaming revenue tax, and slot taxes are levied by the state. The counties levy the county table tax. There are no corporate or personal income taxes in Nevada. (http://classic.relocationcentral.com/).

Nevada's constitutional limit on property tax is $5 per $100 of assessed valuation while the statutory limit is $3.64 per $100. Assessment is at 35 percent of taxable value, and the tax rate is applied to the assessed value. The tax rate for 2001-2002 in the City of Las Vegas is $3.2546 per hundred dollars of assessed value (Clark County, 2002). The taxable value for real

property (land) is full cash value. The project area and the community of Goodsprings are located in Clark County Tax District 100 (Unincorporated County), and the 2001-2002 tax rate is $2.4657 per $100 of valuation. The communities of Jean and Primm are located in Tax District 104 (Unincorporated County Five LVMPD), and the 2001-2002 tax rate is $2.6854 per $100 valuation. The community of Sandy Valley is located in Tax District 103 (Unincorporated County 911), and the 2001-2002 tax rate is $2.4707 per $100 valuation. Boulder City is located in Tax District 052; the 2001-2002 tax rate is $2.2924 per $100 valuation (Clark County, 2002). Table 4-25 lists tax distribution rates for Clark County 2002.

Table 4-25 Tax Distribution

Taxing Agency	Rate
Clark County	0.4163
Family Court	0.0192
Clark County Co Op Ext. Services	0.0100
LVMPD Manpower Supplement	0.2800
Clark County Capital Projects	0.0500
Indigent Medical	0.0765
CC Flood Control	0.0000
Clark County Debt Service	0.0482
State of Nevada	0.1500
School District Maintenance and Operation	0.7500
School District Bond Debt Service	0.5534
State Indigent Trust	0.0150
Clark County Library	0.0687
LV/CC Library Department	0.0284
Total Taxes	2.4657

Source: Nevada Department of Taxation 2001

4.14.8 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was signed on February 11, 1994. Executive Order 12898 directs federal agencies to review proposals and identify, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations to the greatest extent practicable and permitted by law. As such, the proposed Ivanpah Energy Center project, must be evaluated in terms of an adverse effect that:

a. is predominately borne by a minority population and/or low-income population; or,

b. will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or nonlow-income population.

An analysis of the project impact on minority and/or low-income populations from development of the site is based on census data and land use of the project site.

4.14.9 Population and Land Use Resources

Large sections of the proposed IEC project site are administered by BLM and the private lands have been acquired by Boulder City. All land uses in the area are managed under the *Las Vegas* RMP, (BLM, 1998) as mandated under the *Federal Land Policy and Management Act* (FLPMA) of 1976 (43 CFR 1600). The RMP is the primary planning document that governs development of the proposed site. The RMP also replaces the Clark County Management Framework Plan (BLM, 1998) for all BLM lands. The BLM manages lands that are under their jurisdiction that are primarily used for recreation, conservation, mining, communications, and utility corridors.

Private lands are under the jurisdiction of Clark County, the Southern Nevada Regional Planning Coalition, the Clark County School District, and area cities. Also, the Clark County Comprehensive Plan recognizes the special status and circumstance of private in-holdings and states "...private in-holdings in federally designated areas of Clark County should be acquired by the Federal Government through land exchange or other available funding programs when a 'willing seller/ willing buyer' situation exists."

SECTION 5
ENVIRONMENTAL CONSEQUENCES

Overview of Alternatives Retained for Consideration

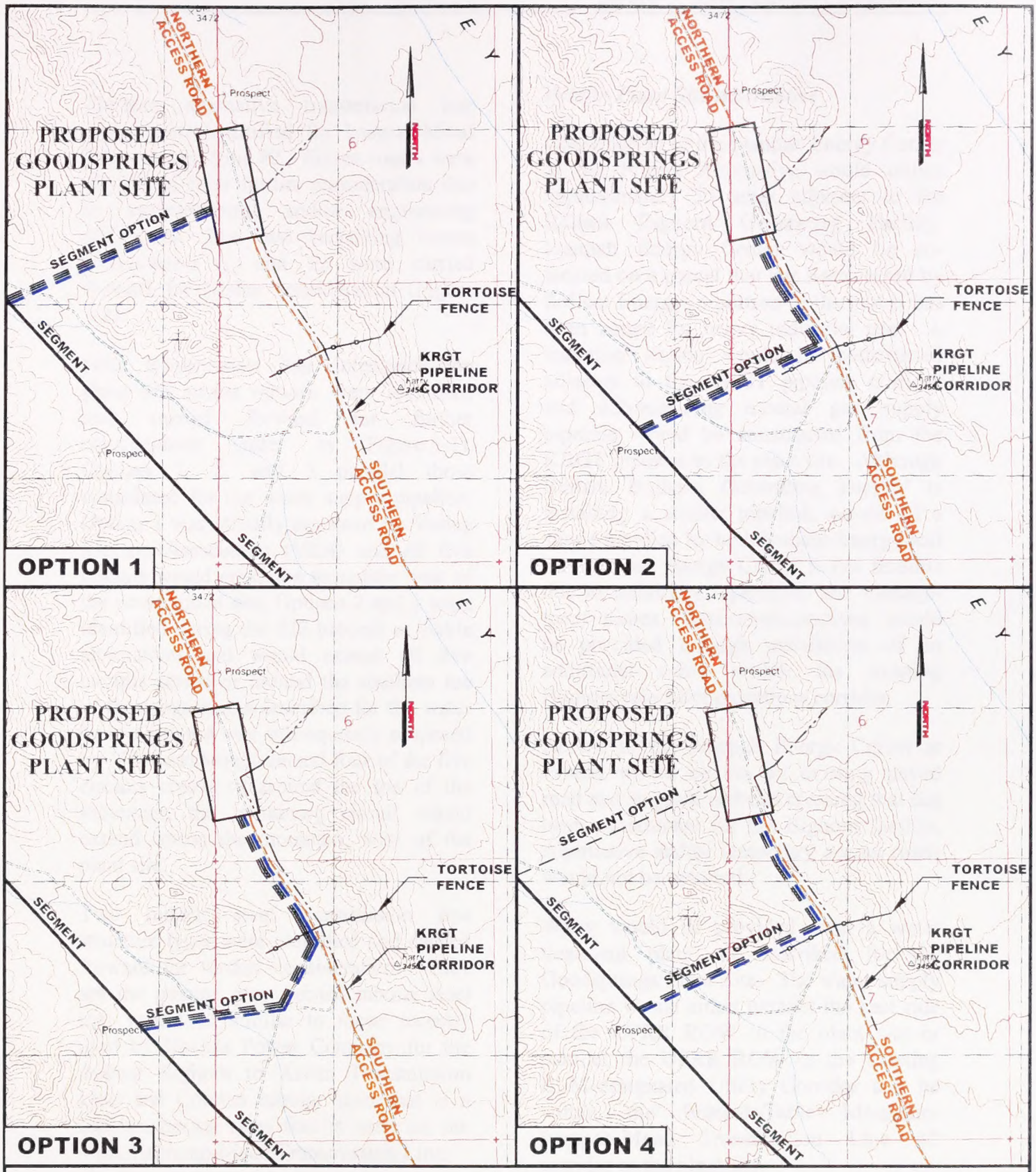
Although several potential plant sites were evaluated for the Ivanpah Energy Center location, the site near Goodsprings (Proposed Goodsprings Plant Site) and a site near Primm (Primm Plant Site Alternative) were considered suitable for further analyses (refer to Section 3.0).

Proposed Goodsprings Plant Site

The Proposed Goodsprings Plant Site would require construction of the Ivanpah Energy Center on a 30-acre tract that is approximately 2.5 miles from the town center. A 10-acre tract that is adjacent to the plant site would be used as a temporary laydown area. A natural gas supply pipeline would be constructed from the Kern River Gas Transmission (KRGT) pipeline and a 7,200-foot-long telecommunications line would be installed from the vicinity of the KRGT Gas Compressor Station to the plant site.

An existing unpaved county road would be modified to reduce vertical and horizontal curves and paved to serve as the main access to the plant. Existing unpaved county roads and an undesignated trail would provide temporary access to the plant during construction. Although improvements to the county roads would not be necessary, the trail would be widened to approximately 18 feet to allow movement of heavy loads. A 2,000-foot-long segment of the northern access road would be reconfigured around the plant site to ensure public access to county roads and public lands to the south.

A water treatment plant would be constructed in the vicinity of the SNCC, in Jean. The treatment plant would be placed on one of two 0.7-acre parcels along the north side of Prison Road. A pipeline would be installed to convey treated water from the treatment plant to the Ivanpah Energy Center. The pipeline would be installed parallel to west side of the UPRR ROW to (and within) the existing BLM-designated Utility Corridor that would be used by the proposed Ivanpah-Mead Transmission Line #2. Three water supply IEC plant access options were identified and carried forward for further consideration (Figure 5-1). Option 1 would cross a small mountain west of the Ivanpah Energy Center (Mira Mountain) to the Ivanpah facility. Options 2 and 3 would enter the Ivanpah Energy Center from the south. Option 2 would traverse the southern toe of the mountain; Option 3 would extend around the southern toe of the mountain, parallel to an existing gravel road. The selected option would parallel the selected transmission line interconnection.



PARSONS

IVANPAH ENERGY CENTER PROJECT

FIGURE 5-1
PLANT ACCESS OPTIONS
(PROPOSED GOODSPRINGS PLANT SITE)

Thirteen alternative transmission line routes were identified for Ivanpah-Mead Transmission Line #2. Eleven routes were eliminated from further consideration due to environmental and/or engineering difficulties. The two remaining routes (Alternatives C and E) were carried forward for further consideration (Figure 5-2).

Four transmission line interconnection plant site access options were identified and carried forward for further consideration (refer to Figure 5-1). Options 1, 2, and 3 parallel those considered for the water supply pipeline; Option 1 was initially proposed by Valley Electric Association (VEA) and all five circuits would cross the mountain west of the power plant site, Options 2 and 3 were identified during the EIS process as viable alternatives and would extend all five circuits across or around the southern toe of the mountain as described for the water line. Option 4 was subsequently proposed by VEA and would extend four of the five circuits across or around the toe of the mountain; the remaining circuit would extend across the mountain, west of the plant site.

Two tubular steel transmission line structure types were identified and carried forward for further consideration. They are the painted gray-painted tubular steel that would be similar to those recently used by Nevada Power Company for the Reliant Bighorn to Arden Transmission Line and Coreten tubular steel that is a self-weathering steel that is used on the VEA Pahrump-Mead Transmission Line.

Primm Plant Site Alternative

Construction of the Ivanpah Energy Center at the Primm Alternative would utilize approximately 30 acres adjacent to the Reliant Bighorn Generating Facility. Ivanpah Energy Center would be co-located on a parcel that has been leased by Reliant Energy; a portion of the parcel has been zoned for heavy industrial use. A metering station would be constructed adjacent to the KRGT pipeline corridor and 3.2-mile-long natural gas supply pipeline would be constructed from the KRGT pipeline to the plant site. Although Reliant Bighorn Generating Facility is installing a similar pipeline, co-use of a single pipeline by both Reliant Energy and the Ivanpah Energy Center is not feasible due to reliability, operation, and management issues. Telecommunications would be provided through installation of an additional cable within the existing Bighorn telecommunications corridor.

Access to the Ivanpah Energy Center at Primm would be via an existing paved road and at-grade railroad crossing that has been constructed for the Bighorn facility. Alternative and/or temporary access roads would not be required.

Water would be provided from a water treatment plant, as described for the Goodsprings Plant Site. The water supply pipeline would either parallel the east side of the UPRR ROW to the plant site or parallel the UPRR ROW to the existing BLM-designated Utility Corridor and be within the Ivanpah-Table Mountain/ Ivanpah-Mead Transmission Line #2 corridor to the plant site.

Proposed Table Mountain Substation

10

Proposed Goodsprings Plant Site

20

30

JEAN

50

60

60/65

25

15

Reliant Bighorn Generating Facility

Primm Plant Site Alternative

90

110

120

130

140

Mead Substation

N

FIGURE 5-2
TRANSMISSION LINE ALTERNATIVES RETAINED FOR FURTHER ANALYSIS

IVANPAH ENERGY CENTER PROJECT

PROPOSED TRANSMISSION LINE

APPROX. SCALE

0 5 10 Miles

PARSONS



Four alternative transmission line routes were identified and carried forward for the Ivanpah-Mead Transmission Line. Although several alternative routes were identified for the Ivanpah-Table Mountain circuit, two were carried forward for further consideration. A total of four alternatives were carried forward for the Ivanpah-Mead #2 Transmission Line.

Alternatives that are part of the Proposed Goodsprings Plant Site and the Primm Plant Site Alternative are summarized in Table 5-1.

Table 5-1 Summary of Alternatives Retained for Further Consideration

Project Component	Proposed Goodsprings Plant Site	Primm Plant Site Alternative
IEC Plant Site Location Alternatives	Alternative E— Proposed Goodsprings Plant Site	Alternative F – Primm Plant Site (co-location with Reliant Bighorn)
Natural Gas Pipeline	Direct connection to plant site. No routing required.	3.2-mile-long pipeline from KRGT and 0.46 acre metering station.
Telecommunications Line	Installation along a 7,200-foot-long corridor from the KRGT Compressor Station to the plant.	Installation along the existing Sprint Communications line in use by Reliant. No routing required
Access Roads	Northern Access (County Road 53Y), 20-foot-wide, paved, 3-foot-wide shoulders.	Access available on paved road through the Bighorn facility.
	Southern Access (County Road 28, existing trail, and County Road 53Y). Trail bladed to 18-foot-width.	
Water Treatment Facility	Use of one of two 0.7-acre parcels north of Prison Road.	
Water Supply Pipeline Route	South from SNCC along the west side of the UPRR ROW to and within BLM-designated Utility Corridor and Ivanpah-Mead Transmission Line #2 corridor.	Parallel to east side of the UPRR ROW to the plant site.
		Parallel to east side of the UPRR ROW to (and within) the Ivanpah-Mead/Ivanpah-Table Mountain Transmission Line corridor.
Water Supply Pipeline Plant Site Access Options	Across the mountain	N/A
	Traversing the southern slope of the mountain, north of Desert Tortoise fence.	
	Parallel to existing trail, around the southern toe of the mountain	
Transmission Line Alternatives	Alternatives C and E retained for further consideration.	Ivanpah-Mead—Four Alternatives Retained Ivanpah-Table Mountain –Two Alternatives Retained
Transmission Line Plant Site Access Options	Five circuits across the mountain	N/A

Project Component	Proposed Goodsprings Plant Site	Primm Plant Site Alternative
	Five circuits traversing the southern toe of the mountain, north of Desert Tortoise Fence	
	Five circuits parallel to an existing trail, around the toe of the mountain.	
	One circuit across the mountain, four circuits traversing the toe of the mountain	
Structure Type Options	Gray-painted single-pole tubular steel	
	Coreten single-pole tubular steel	
No Action Alternative	No Action Alternative Retained	

Impacts Criteria

The severity of potential impacts (regardless of alternative or resource) has been mitigated to the extent possible, either through generic or specific mitigation measures. Residual impacts that are expressed include the application of appropriate mitigation measures, to the extent practicable. Impact levels identified in the DEIS/EIS are:

- Negligible – An impact is present, but the level of which is too small to quantify.
- Moderate – A measurable (quantifiable) impact is present.
- Significant – As defined in Table 5-2 (Significance Criteria).

Table 5-2 Significance Criteria

Resource	Significance Criteria
Geology, Minerals, Seismicity, Soils, and Mining	Erosion or siltation that would result in irreversible and unacceptable impacts to other resources. Loss of mineral resources that are not available elsewhere. Exposure of facilities or personnel to major geologic hazard (*i.e.*, seismic). Conflicts with existing mining activities that cannot be resolved through negotiation with mine operators.
Groundwater and Surface Water	Reduction in groundwater levels or quality that would preclude the use of such resources by other entities in the Jean – Goodsprings area or would require deepening of existing wells to maintain flow. Degradation of water quality that would result in failure to meet drinking water standards. Loss of flow to area springs. Susceptibility to on-site or off-site flooding due to altered surface hydrology.
Biological Resources	Loss of a unique biological community. Impacts to Category A or B desert tortoise habitat density areas. Reduction of a plant or animal community/population that would severely jeopardize the continued existence of such a plant or animal community/population. Introduction of noxious weeds to a presently uninfested area. Violation of the Endangered Species Act, the Bald Eagle Act, the Migratory Bird Treaty Act, or Nevada State Law. Substantial interference with the movement or nesting of migratory species.
Cultural Resources	Violation of state or federal historic/archaeological/native Americans preservation and protection regulations.
Paleontological Resources	Loss of paleontological resources that would be considered to be of scientific importance.
Land Use and Zoning	Conflict(s) with Clark County land use and zoning that cannot be resolved.
Range Management	Irreversible loss of a large portion of available rangeland that would make livestock production economically unviable.
Recreation	Actions that would preclude or greatly curtail recreational activities. Actions that would jeopardize the health and/or safety of individuals that are engaged in recreational activities.
Transportation	A decrease of roadway or intersection traffic below level of service C. Adverse effects on public safety that would be likely to result hazardous

Resource	Significance Criteria
	conditions, as defined by good engineering practices. Creation of permanent impediments to traffic. Creation of a situation that would require frequent and recurring roadway repair or maintenance. Permanent loss of highway pavement that cannot be replaced/repaired.
Public Services, Utilities, and Public Safety	Actions that would extend public utilities and services beyond their current limitations. Interference with emergency response capabilities or resources.
Hazardous Materials	Actions that would result in health and safety impacts to area residents. Violation of federal, state, or local regulations regarding handling, transport, or containment of hazardous materials as defined under CERCLA or SARA.
Visual Resources	Conflict with VRM management directives as stated in the Resource Management Plan. Inability to mitigate visual impacts as required in each class.
Climate and Air Quality	Violation of ambient air quality standards.
Noise	Actions that exceed county noise standards at sensitive receptors.
Socioeconomics	Induced population growth (beyond expected normal increases) that would result in a lack of public services within the community. Use of tax funds by the community that would not be compensated elsewhere. Permanent and irreversible loss of work for a major sector of the community.
Environmental Justice	A disproportionate share of the adverse socioeconomic impacts borne by minority and/or low-income factions of a community or communities.

Generic Mitigation

The BLM and the project proponent are committed to a series of generic mitigation measures that would be implemented as part of the project to avoid impacts to the environment or to reduce the level of impacts that cannot be fully avoided. Procedures that will be incorporated into the construction and operation of the proposed Ivanpah Energy Center, natural gas supply pipeline, telecommunications line, access roads, water treatment plant, water supply pipeline, and transmission lines are identified in Table 5-3. A Construction, Operation, and Maintenance Plan (COM Plan) that will be prepared prior to construction will include the application of generic mitigation measures as well as mitigation measures that are specific to the project.

Impacts Assessment

Potential project impacts are identified and (to the extent possible) quantified by resource category. Project components are addressed sequentially as:

- Ivanpah Energy Center (including natural gas pipeline and telecommunications line)
- Access roads (north and south)
- Water treatment plant
- Water supply pipeline
- Transmission lines

Table 5-3 Procedures Incorporated into the Proposed Ivanpah Energy Center Project to Reduce Impacts

		Plant Site [1]	Access Roads [2]	Water Treatment Plant	Water Pipelines	Transmission Lines
1	All construction vehicle movement outside the ROW will be restricted to pre-designated access, contractor-acquired access, or public roads. BLM approval will be required prior to movement or activities outside of designated use areas.	X	X	X	X	X
2	The aerial limits of construction activities will be pre-determined, with activity restricted to and confined within those limits. BLM approval will be required prior to movement or activities outside of designated use areas. No paint or permanent discoloring agent will be applied to rocks or vegetation.	X	X	X	X	X
3	In construction areas where re-contouring is not required, vegetation will be left in place whenever possible and original contours will be maintained to avoid excessive root damage and to allow for re-sprouting.	X	X	X	X	X
4	In construction areas (*e.g.*, material laydown areas, structure sites, new access roads, spur roads), where ground disturbance is substantial or where re-contouring is required, surface restoration will be required by the landowner or land management agency. The method of restoration will normally consist of returning disturbed areas back to their natural contour. Permanent fencing will not be used as a means of closing roads or otherwise limiting access, which could result in fragmentation of habitat and/or restricted access by the public to public lands.	X	X	X	X	X
5	Prior to construction, all construction personnel will be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract will address: (a) federal, state, and local laws regarding antiquities, fossils, plants, and wildlife; including collection and removal; and (b) the importance and necessity of protecting such resources.	X	X	X	X	X
6	The project sponsors will respond to individual complaints of radio or television interference generated by the facility and related transmission lines by investigating the complaints and implementing appropriate mitigation measures (*i.e.*, adjusting or using filtering devices).	X				X

		Plant Site [1]	Access Roads [2]	Water Treatment Plant	Water Pipelines	Transmission Lines
7	Roads will be constructed at right angles to arroyos and drainages, to the extent practicable. All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and drainage banks. Additionally, road construction will include dust control measures during construction in sensitive areas. All existing roads will be left in a condition that is equal to, or better than, their condition prior to construction.		X		X	X
8	All requirements related to entities that have jurisdiction over air quality matters will be adhered to and any permits needed for construction activities will be obtained prior to construction. Open burning of construction trash will not be allowed.	X	X	X	X	X
9	Fences, gates, and livestock/tortoise guards will be replaced or repaired to their original (pre-construction) condition, as required by the landowner or land management agency, if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or land management agency.		X	X	X	X
10	Hazardous materials will not be drained into the ground or into arroyos or drainages. Totally enclosed containers will be provided for all trash. All construction waste; including trash and litter, garbage, other solid trash, petroleum products, and other potentially hazardous materials will be removed and taken to a disposal facility that is authorized to accept such materials.	X	X	X	X	X
11	If a hazardous material is released/spilled, the BLM will be notified immediately and actions will be taken to limit the extent of contamination.	X	X	X	X	X
12	Special status species or other species of particular concern will continue to be considered during the construction phase of the facility and during operation of the facility, in accordance with management policies that are set forth by the appropriate resource management agency. This will entail monitoring for plant and wildlife species of concern that may be affected by construction activities. In cases where such species are identified, appropriate action will be taken to avoid adverse impacts to the species and its habitat. Such actions may include altering the placement of roads or structures as practicable, and monitoring construction activities.	X	X	X	X	X
13	A refrigerated air-cooled generating facility will be constructed, thus minimizing cooling water requirements.	X				

		Plant Site [1]	Access Roads [2]	Water Treatment Plant	Water Pipelines	Transmission Lines
14	Advanced controls will be used to minimize air emissions.	X				
15	Gray water (treated effluent from the Southern Nevada Correctional Center) would be used for plant process water makeup and NO_x control, rather than the use of groundwater. The use of groundwater would be minimized to the extent practicable.	X		X		
16	Permanent plant site power (during construction and when non-operational) would be provided by back-feeding power from the VEA system. Distribution power would not be required.	X				
17	Plant infrastructure would be painted, using a color to minimize visual contrast.	X		X		
18	A Clark County-approved dust control plan will be implemented to reduce airborne particulate matter during construction.	X	X	X	X	X
19	A construction, operation, and maintenance (COM) plan will be developed to direct and control activities that are consistent with generic and specific mitigation measures, as well as all resource and safety concerns, as required by the BLM or other agencies.	X	X	X	X	X
20	Single-pole structures, rather than lattice structures, will be used to the extent practicable.					X
21	The project sponsors will apply mitigation needed to reduce or eliminate potential conflicts with existing transmission lines in the area. Excessive line crossings will be avoided, to the extent practicable.					X
22	When practicable, steps will be taken to avoid compromising system reliability.					X
23	The sponsor will apply mitigation measures needed to eliminate problems of induced currents into conductive objects within the ROW.					X
24	The sponsor will monitor project transmission lines to determine the effects of audible noise and electrostatic and electric and magnetic fields, if necessary.					X
25	Transmission line materials will be designed and tested to minimize corona. Tension will be maintained on all insulator assemblies to assure positive contact between insulators, thereby avoiding sparking. Caution will be exercised during construction to avoid nicking the conductor surface, which may provide points for corona to occur.					X

		Plant Site [1]	Access Roads [2]	Water Treatment Plant	Water Pipelines	Transmission Lines
26	Mitigation measures developed during Section 7 consultations with the U.S. Fish and Wildlife Service (USFWS) will be adhered to as specified in the Biological Opinion of the USFWS.	X	X	X	X	X
27	Mitigation developed in association with state and Native American tribal authorities will be adhered to.	X	X	X	X	X

[1] Including natural gas metering station and pipeline – Primm Plant Site only
Including telecommunications line – Goodsprings Plant Site only
[2] Applicable to Goodsprings Plant Site only.

5.1 PLANT SITE ALTERNATIVE E – PROPOSED GOODSPRINGS SITE

5.1.1 Geology and Minerals, Seismicity, Soils, and Mining

Summary of Impacts Related to Geology, Minerals, Seismicity, Soils, and Mining	
Significance Criteria: Erosion or siltation that would result in irreversible and unacceptable impacts to other resources. Loss of mineral resources that are not available elsewhere. Exposure of facilities or personnel to major geologic hazard (*i.e.*, seismic). Conflicts with existing mining activities that cannot be resolved through negotiation with mine operators.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Permanent (life of the project) loss of approximately 30 acres of native soils. Temporary loss of 10 acres for plant site laydown and 0.8 acres for telecommunications line installation. Negligible overall impacts to regional resources. Seismic hazard expected to be negligible. Potential impacts to active mining claims are not anticipated.	Soils disturbed during construction would be stabilized to the extent practicable. Revegetation would take place in accordance with BLM restoration plans.
Access Roads: North Access Road: permanent (life of the project) loss of approximately 2.7 acres of native soil. South Access Road: temporary loss of approximately 2.6 acres of native soil. Negligible overall impacts to regional resources. Potential impacts to active mining claims are not anticipated.	Road construction would be minimized to the extent practicable. Roads would be constructed perpendicular to drainages, to the extent practicable. Temporary use road (trail) would be restored following use and returned to BLM.
Water Treatment Plant: Permanent (life of the project) loss of approximately 0.7 acres of native soils.	Soil Disturbance would be minimized to the extent practicable.
Water Supply Pipeline: Temporary disturbance to 53 acres of native soils. Moderate soil erosion impacts associated with construction of plant site access Option 1; negligible erosion impacts associated with Options 2 or 3. Potential impacts to active mining claims are not anticipated.	Soils disturbed during construction would be stabilized to the extent practicable. Revegetation would take place in accordance with BLM restoration plans.
Transmission Line: Negligible temporary disturbance to as much as 228 acres during construction. Negligible permanent (life of project) use of 9 acres of land. Moderate soil erosion expected to be associated with construction of plant access Options 1 or 4; Negligible soil erosion expected to be associated with construction of Option 2 or 3. Potential impacts to active mining claims are not anticipated.	Soils disturbed during construction would be stabilized to the extent practicable. Revegetation would take place in accordance with BLM restoration plans. Modifications to structure locations can be made (to the extent practicable) to avoid potential impacts to mining claims and drainages.

Geology and Soils

Construction of the Ivanpah Energy Center at the proposed Goodsprings Plant Site would include grading and leveling of existing materials to provide a suitable area for facilities construction. Grading and filling also would be required for drainage control; the telecommunications line would require trenching to a sufficient depth for installation of a subsurface line from the vicinity of the existing Kern River Goodsprings Gas Compressor Station to the IEC plant site. Construction of the northern and temporary southern access roads, installation of the water treatment plant (near Jean), installation of the water supply pipeline, and transmission lines would have similar impacts to geological and soils resources in the area.

Disturbance of lands would introduce the potential for increased soil erosion as a result of wind and water influences. Although such impacts are not expected to be significant, they would be greater within areas of relatively steep terrain, such as proposed transmission line corridors across Crystal Pass and across the McCullough Range. Other impacts associated with the proposed action include potential conflicts with mining claims and mining operations in the area.

The application of mitigation measures such as appropriate engineering designs and the use of appropriate construction materials would reduce the potential severity of impacts that are related to soil erosion. Additional mitigation measures that could be taken include the use of storm water retarding structures, channel protection measures, and revegetation of disturbed areas. Potential impacts to mining and mineral claims can be mitigated by through avoidance or through negotiated agreement with mining and mineral claim entities.

Proposed Goodsprings Plant Site

Construction and operation of the Goodsprings Ivanpah Energy Center (including the natural gas supply line and the telecommunications line) would result in negligible impacts to geological or mineral resources within the area. Lands used for such facilities would result in long-term and short-term disturbance to geological resources and soils. Long-term (life of the project) impacts would affect approximately 30 acres at the plant site. Temporary use of the plant site laydown area would affect approximately 10 acres and installation of the telecommunications line would result in temporary disturbance to 0.8 acres. Temporary disturbance related to the installation of the natural gas supply pipeline would be nominal. Areas that would be temporarily disturbed would be restored in accordance with BLM's approved restoration plan following construction and prior to returning the use of the land to the BLM.

Quaternary normal-faults bound several mountain ranges in southern Nevada, and the nearby Death Valley-Furnace Creek fault system is considered to be one of the most tectonically active structures in the Basin and Range Province (Dohrenwend *et al.*, 1991; Hannsen, 1991; Hart and Bryant, 1999).

Although range front BRP faults may exist along the Spring Mountains (West of the Goodsprings Plant Site) or the McCullough Range, the potential for seismic impacts to the facility is believed

to be low. Furthermore, seismic activity within the area has historically been low. Therefore, potential impacts to the plant were considered to be negligible.

Access Roads

Construction of the paved (northern) access road would result in the permanent loss of approximately 2.7 acres of soils and geological resources during the life of the project. Short-term impacts would result from modifications to an existing trail south of the plant site. Blading of the trail would increase the average width from approximately 10 feet to 18 feet along 2.6 miles; approximately 2.6 acres would be affected. Impacts would be negligible, from a regional perspective.

Water Treatment Plant

Installation of a water treatment facility would result in the permanent (life of the project) loss of 0.7 acres of native soils. Impacts to geology and soils are expected to be negligible, regardless of water treatment plant site location. There are no mining activities in the area.

Water Supply Pipeline

Geological resources, minerals, and soils that would be affected during construction and operation of the water supply line are expected to total approximately 53 acres along the 10.9-mile-long alignment. Although use of the ROW for mining would be essentially eliminated during the life of the project, impacts to soils would be temporary. Areas disturbed during construction would be restored in accordance with BLM's approved restoration plan.

Construction of a water supply pipeline over the mountain west of the plant site (as described in Option 1) would result in moderate impacts to soils. Those that traverse the southern toe of the mountain (Options 2 or 3) would result in negligible impacts. Although Option 1 is shorter than those of Options 2 or 3, construction of Option 1 would require trenching perpendicular to steep slopes, which would result in greater soil erosion potential than construction on relatively level terrain.

Transmission Lines

Potential impacts to geological resources, minerals, and soils are similar among the two transmission line alternatives. Linear distances crossed by Alternatives C and E differ by 1,600 feet, which represents approximately 0.7 percent of their total length of approximately 251,000 linear feet. Potential impacts to soils are likely to be greater through the McCullough Range (Ivanpah-Mead #2 circuit) and through Crystal Valley (Ivanpah-Table Mountain #1 and #2 circuits) than other portions of the project due to steep terrain. Permanent (life of the project) impacts related to construction of the transmission line would affect approximately 9 acres. Temporary impacts related to construction are expected to total approximately 228 acres. Approximately 177 acres would be temporarily disturbed within the ROW, primarily for pole work areas; 33 acres would be temporarily disturbed outside of the ROW for pulling and tensioning sites and spur roads. An additional 18 acres would be temporarily disturbed outside the ROW for laydown areas.

Soils disturbance can be minimized, to the extent practicable, by using existing roads and trails that were created during installation of the Pahrump-Mead Transmission Line, the Reliant Bighorn-Arden Transmission Line, and other transmission lines. Structure-for-structure

placement from the Table Mountain Substation to Eldorado Valley would facilitate use of existing spur roads and access roads that were recently created by Nevada Power Company as part of the Reliant Bighorn-Arden Transmission Line and the existing VEA Pahrump-Mead Transmission Line. Although no laydown areas have been identified, potential locations appear to be readily available within areas that have been previously cleared as a result of the Reliant Bighorn-Arden Transmission Line and Mead Substation. Other sites that would be available include the temporary laydown area at the Ivanpah Energy Center plant site and the Quality Earth Minerals mining site near Hidden Valley. Areas required are expected to total less than 18 acres. Temporary impacts attributed to construction would result in negligible impacts because areas would be revegetated and restored in accordance with BLM's restoration plans.

Potential impacts to minerals and soils related to plant site access Options 1 through 4 indicate greater impacts would be associated with Options 1 or 4 than would result from Options 2 or 3. Construction of as many as three parallel structures across the mountain west of the plant site (Option 1) or a single line of structures (Option 4) would result in moderate erosion impacts; construction on relatively level terrain (Options 2 or 3) would result in negligible impacts. Regardless of option selected, potential impacts would be minimized by revegetation in accordance with BLM's approved restoration plan; however, revegetation along steep slopes would be more difficult and would likely be less successful than that along relatively flat terrain.

IMPACTS TO MINING

Minerals

Leasable Minerals: There are no known sources of leasable minerals on lands that would be affected by the proposed action, although geological conditions are consistent with potential deposits of oil, gas, coal, potassium, and sodium in the vicinity of the project area.

Locatable Minerals: Data on file at the BLM indicate that several mines and mine claims are located in the vicinity of the project site, including transmission line alternatives. A listing of mining claims (as of September 2002) that could be affected by the Proposed Action is provided in Table 5-4.

Ivanpah Energy Center

Data from the BLM that were compiled as of September 2002 indicate that there are mining claims in the vicinity of the proposed plant site. However, potential impacts to mining that would be associated to the development or operation of the generating facility are likely to be mitigated through direct negotiation with the mining operator or lease holder. Although geological conditions in the area are consistent with potential deposits of oil and gas potential impacts to such resources are not anticipated.

Access Roads

Data from the BLM that were compiled as of September 2002 indicate that there are no mining claims that would be affected by development or use of either the northern or the southern access roads. Therefore, there are no potential mining impacts that would be associated with modifications to the existing trail that would be used for site access. Although geological conditions in the area are consistent with potential deposits of oil and gas potential impacts to such resources are not anticipated.

Table 5-4 Mining Claims That Could Be Affected by Development of the Proposed Goodsprings Plant Site

LOCATION	AFFECTED BY	ALIQUOT PART	CLAIM NAME	CLAIMANT	Count Affected
T24S, R58E, SECT.34	TMS 10	SE	JEAN 1	PALMER PAMELA G	1
T24S, R58E, SECT.34	TMS 10	SE	JEAN 2	PALMER PAMELA G	2
T24S, R58E, SECT.34	TMS 10	SE	JEAN 3	PALMER PAMELA G	3
T24S, R58E, SECT.34	TMS 10	SE	JEAN 4	PALMER PAMELA G	4
T24S, R58E, SECT.34	TMS 10	SE	JEAN 5	PALMER PAMELA G	5
T24S, R58E, SECT.34	TMS 10	SE	JEAN 6	PALMER PAMELA G	6
T24S, R58E, SECT.34	TMS 10	SE	JEAN 7	PALMER PAMELA G	7
T24S, R58E, SECT.34	TMS 10	SE	JEAN 8	PALMER PAMELA G	8
T25S, R58E, SECT.01	IEC 20	NE SE	D-5	DIAMOND GENERATING CORP	1
T25S, R58E, SECT.01	IEC 20	NE SE	D-6	DIAMOND GENERATING CORP	2
T25S, R58E, SECT.01	IEC 20	NE SE	D-8	DIAMOND GENERATING CORP	3
T25S, R58E, SECT.01	10 20 30 WL	SW	JEAN 49	PALMER PAMELA G	4
T25S, R58E, SECT.01	10 20 30 WL	SW	JEAN 50	PALMER PAMELA G	5
T25S, R58E, SECT.01	10 20 30 WL	SW	JEAN 51	PALMER PAMELA G	6
T25S, R58E, SECT.01	10 20 30 WL	SW	JEAN 52	PALMER PAMELA G	7
T25S, R58E, SECT.01	10 20 30 WL	SW	JEAN 54	PALMER PAMELA G	8
T25S, R58E, SECT.01	10 20 30 WL	SW	JEAN 55	PALMER PAMELA G	9
T25S, R58E, SECT.02	10	NW	JEAN 12	PALMER PAMELA G	10
T25S, R58E, SECT.02	10	NW	JEAN 13	PALMER PAMELA G	11
T25S, R58E, SECT.02	10	NW	JEAN 14	PALMER PAMELA G	12
T25S, R58E, SECT.02	10	NW	JEAN 15	PALMER PAMELA G	13
T25S, R58E, SECT.02	10	NE NW	JEAN 16	PALMER PAMELA G	14
T25S, R58E, SECT.02	10	NE	JEAN 17	PALMER PAMELA G	15
T25S, R58E, SECT.02	10	NE	JEAN 18	PALMER PAMELA G	16
T25S, R58E, SECT.02	10	NE	JEAN 19	PALMER PAMELA G	17
T25S, R58E, SECT.02	10	NE	JEAN 20	PALMER PAMELA G	18
T25S, R58E, SECT.02	10	NE	JEAN 21	PALMER PAMELA G	19
T25S, R58E, SECT.02	10	NW	JEAN 27	PALMER PAMELA G	20
T25S, R58E, SECT.02	10	NW	JEAN 28	PALMER PAMELA G	21
T25S, R58E, SECT.02	10	NW	JEAN 29	PALMER PAMELA G	22
T25S, R58E, SECT.02	10	NW	JEAN 30	PALMER PAMELA G	23
T25S, R58E, SECT.02	10	NE	JEAN 31	PALMER PAMELA G	24
T25S, R58E, SECT.02	10	NE	JEAN 32	PALMER PAMELA G	25
T25S, R58E, SECT.02	10	NE	JEAN 33	PALMER PAMELA G	26
T25S, R58E, SECT.02	10	NE	JEAN 34	PALMER PAMELA G	27
T25S, R58E, SECT.02	10	SE	JEAN 45	PALMER PAMELA G	28
T25S, R58E, SECT.02	10	SE	JEAN 46	PALMER PAMELA G	29
T25S, R58E, SECT.02	10	SE	JEAN 47	PALMER PAMELA G	30
T25S, R58E, SECT.02	10	SE	JEAN 48	PALMER PAMELA G	31
T25S, R58E, SECT.02	10	SE	JEAN 53	PALMER PAMELA G	32

LOCATION	AFFECTED BY	ALIQUOT PART	CLAIM NAME	CLAIMANT	Count Affected
T25S, R59E, SECT.06	IEC	NW SW	D-5	DIAMOND GENERATING CORP	1
T25S, R59E, SECT.06	IEC	NW SW	D-7	DIAMOND GENERATING CORP	2
T25S, R59E, SECT.06	IEC	NW SW	D-8	DIAMOND GENERATING CORP	3
T25S, R59E, SECT.23	WL	SW	BARON ASSOC # 2	BARON MINING CORP	4
T25S, R59E, SECT.23	WL	SE	BARON ASSOC # 3	BARON MINING CORP	5
T25S, R59E, SECT.23	WL	NE	BARON ASSOC # 5	BARON MINING CORP	6
T25S, R59E, SECT.26	WL	NW	BARON ASSOC # 7	BARON MINING CORP	7
T25S, R59E, SECT.26	50	SW	BARON ASSOC # 9	BARON MINING CORP	8
T25S, R59E, SECT.27	50	SE	BARON ASSOC # 8	BARON MINING CORP	9
T25S, R59E, SECT.35	50	NW	BARON ASSOC # 10	BARON MINING CORP	10
T25S, R60E, SECT.33	60	NE	GRANT 30	BARHAM R C	1
T25S, R60E, SECT.33	60	SE	GRANT #1	DAKOTA WEST INC	2
T25S, R60E, SECT.33	60	NE	G BERNADOT FLP #8	BERNADOT BRAD	3
T25S, R60E, SECT.33	60	SE	G BERNADOT FLP #9	BERNADOT GEORGE	4
T25S, R60E, SECT.33	60	SW	G BERNADOT FLP #10	BERNADOT GEORGE	5
T25S, R60E, SECT.34	60	SW	GRANT #2	DAKOTA WEST INC	6
T25S, R60E, SECT.34	60	SW	GRANT #3	DAKOTA WEST INC	7
T25S, R60E, SECT.34	60	NE	GRANT #13	DAKOTA WEST INC	8
T25S, R60E, SECT.34	60	NE	GRANT #14	DAKOTA WEST INC	9
T25S, R60E, SECT.34	60	NW	GRANT #15	DAKOTA WEST INC	10
T25S, R60E, SECT.34	60	NW	GRANT #16	DAKOTA WEST INC	11
T25S, R61E, SECT.20	60	NE	EL #24	RILITE AGGREGATE CO	1
T25S, R61E, SECT.21	60	NW	EL #25	RILITE AGGREGATE CO	2
T25S, R61E, SECT.21	60	NW	EL #26	RILITE AGGREGATE CO	3
T25S, R61E, SECT.21	60	NW	EL #27	RILITE AGGREGATE CO	4
T25S, R61E, SECT.21	60	NE	EL #30	RILITE AGGREGATE CO	5
T25S, R61E, SECT.21	60	NE	EL #31	RILITE AGGREGATE CO	6
T25S, R61E, SECT.21	60	NE	EL #32	RILITE AGGREGATE CO	7
T25S, R61E, SECT.21	60	NE	EL #33	RILITE AGGREGATE CO	8
T25S, R61E, SECT.21	60	NW	EL #36	RILITE AGGREGATE CO	9
T25S, R61E, SECT.21	60	NE SE	EL #40	RILITE AGGREGATE CO	10
T25S, R61E, SECT.21	60	NE SE	EL #41	RILITE AGGREGATE CO	11
T25S, R61E, SECT.22	60	NW	EL #33	RILITE AGGREGATE CO	12
T25S, R61E, SECT.22	60	SW	EL #41	RILITE AGGREGATE CO	13
T26S, R59E, SECT.01	50	NE	GG 1	CALLAHAN EUGENE	1
T26S, R59E, SECT.01	50	NW	GG 2	CALLAHAN EUGENE	2
T26S, R59E, SECT.12	WL	SW	GG 9	CALLAHAN EUGENE	3
T26S, R60E, SECT.04	60	NW	GRANT #22	DAKOTA WEST INC	3
T26S, R60E, SECT.06	50	NW	SIERRA #1	DAVIS BYRON	5
T26S, R60E, SECT.06	50	NE	SIERRA #2	DAVIS BYRON	6
T26S, R60E, SECT.06	50	SW	SIERRA #3	DAVIS BYRON	7
T26S, R60E, SECT.06	50	SE	SIERRA #4	DAVIS BYRON	8

TMS – Proposed Table Mountain Substation IEC – Ivanpah Energy Center
WL – Water Supply Pipeline

Water Treatment Plant

The proposed water treatment plant (regardless of optional sites selected) would be on State of Nevada land. Data from the BLM indicate that there are no mining claims that would be affected by construction or operation of the facility, regardless of plant site selected.

Water Supply Pipeline

Data from the BLM that were compiled as of September 2002 indicate that approximately 14,000 linear feet of the proposed water supply pipeline would cross 10 active mining claims along the northern portion of the proposed corridor. The northern portion of the pipeline corridor and the western portion of the corridor that is within a BLM-designated Utility Corridor are within areas that are geologically consistent with potential oil and gas deposits, however, potential impacts to such resources are not expected. Although construction of the pipeline could affect mining in the area, it would be located adjacent to the UPRR and within a BLM Utility Corridor and is likely not to result in impacts to mining in the area.

Transmission Lines

Data from the BLM that were compiled as of September 2002 indicate that approximately 40,000 linear feet of Transmission Line Alternatives C and E cross 74 active mining claims. Thirty-four mining claims are located along a segment of the transmission line corridor east of I-15 to the base of the McCullough Range; 40 claims are located along the segment to the Table Mountain Substation. None of the four transmission line plant access options are known to cross mining claims.

Although construction of the proposed transmission line (including the segment from the IEC facility to Table Mountain Substation) would cross active mining claims, impacts to mining operations are not anticipated. A mine, operated by Quality Earth Materials, is located in Hidden Valley and is the only known large active mine that is known to be near the transmission line. Based on discussions with the mine owner/operator, mining operations would be a considerable distance from the proposed transmission line route and neither facility is expected to impact the other facility (Finley, 2002). Furthermore, potential impacts to the mine, or other mines, could be minimized by modifications to structure locations. The extent of such modifications would be dependent upon engineering considerations and cost.

Salable Minerals: There are known salable minerals within the proposed project site, including transmission line routes.

5.1.2 GROUNDWATER AND SURFACE WATER

Summary of Impacts Related to Groundwater and Surface Water	
Significance Criteria: Reduction in groundwater levels or quality that would preclude the use of such resources by other entities in the Jean – Goodsprings area or would require deepening of existing wells to maintain flow. Degradation of water quality that would result in failure to meet drinking water standards. Loss of flow to area springs. Susceptibility to on-site or off-site flooding due to altered surface hydrology.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Negligible short-term impacts related to the use of water for dust control during construction. Negligible impacts related to plant operations because treated wastewater from the Southern Nevada Correctional Center would be the primary water source for plant operations.	Water requirements total approximately 50 acre-feet per year because the plant would operate using an air-cooled condenser and refrigerated air. Treated wastewater would be used as the primary water source for the plant. Water usage during construction would be in compliance with a Clark County Dust Control Permit.
Access Roads: Negligible short-term impacts related to the use of water for dust control during construction.	Water usage during construction would be in compliance with a Clark County Dust Control Permit.
Water Treatment Plant: Negligible short-term impacts related to the use of water for dust control during construction.	Water usage during construction would be in compliance with a Clark County Dust Control Permit.
Water Supply Pipeline: Negligible short-term impacts related to the use of water for dust control.	Water usage during construction would be in compliance with a Clark County Dust Control Permit.
Transmission Line: Negligible short-term impacts related to the use of water for dust control during construction.	Water usage during construction would be in compliance with a Clark County Dust Control Permit.

Potential impacts associated with water resources could result from excessive drawdown of local aquifers. If such a condition were to occur, the cost of groundwater pumpage by area users could increase; in severe conditions, groundwater could become unavailable.

The project proponent has taken action to reduce water process requirements for facilities operations. The proposed Ivanpah Energy Center would utilize an air-cooled condenser, in a process referred to as dry cooling, to condense spent steam from the steam turbine so that it can be re-used. Dry cooling reduces plant water usage by 90 percent or more as compared to conventional wet cooling methods. The use of dry cycling, as proposed by the project proponent, reduces water usage from 3,000 acre-ft per year (afy) or more to about 300 afy. In order to further reduce water requirements at the proposed plant, inlet air to the gas turbines will be cooled using mechanical refrigeration rather than evaporative cooling. Refrigeration will increase inlet air density and thus increase turbine power output. The combination of dry cooling and refrigerated air will reduce water requirements at the Ivanpah Energy Center to 50 afy or less.

Potential impacts to water resources would be further reduced by the use of gray water from the Southern Nevada Correctional Center (SNCC), near Jean. When fully operational, gray water flows from the correctional center are expected to meet or exceed all process water requirements for the plant. If gray water flows from the SNCC are interrupted or curtailed, water from an area well would be used. The amount of water that would be used form the well cannot be estimated; however, it is likely that it would not be significant.

Potential impacts to surface water hydrology could occur if facilities construction were to alter drainage patterns to an extent that substantial flooding would occur elsewhere. Other potential impacts include increased erosion and siltation of receiving streams and drainages and modifications to existing drainages that would affect sensitive species or habitat. Construction of the proposed facility, telecommunications line, access roads, water treatment plant, water supply pipeline, and transmission lines would not substantially affect drainage patterns in the project area. Furthermore, potential impacts associated with increased erosion and sediment transport of soils would be reduced to the extent practicable through appropriate storm water controls and revegetation of disturbed areas.

Proposed Goodsprings Plant Site

Pumpage from existing water wells is depleting water sources.

Questions regarding the amount and source of water required for construction.

Construction and operation of the proposed Ivanpah Energy Center (including the natural gas supply line and the telecommunications line) would result in negligible impacts to groundwater resources within the area. Due to the overall absence of surface waters, such resources would not be affected.

Construction of the Ivanpah Energy Center (and other project elements) would require the use of water for dust control. Water sources that are typically used for such purposes are likely to include potable water that is available through area wells and through the Las Vegas water system. Given that water needs for construction are relatively short-term and likely to extend no more than four months for plant site preparation, water requirements are expected to represent a negligible impact to groundwater resources.

Ivanpah Energy Center will require approximately 50 acre feet per year (afy) of water for facilities operation, an amount that represents approximately 2.3 percent of annual groundwater recharge within the valley (Harrill *et al.*, 1988). Other users in Ivanpah Valley total less than 700 afy, which represents approximately 32 percent of the annual recharge rate. Groundwater would only be used if gray water flows from the SNCC were curtailed or interrupted.

The Ivanpah Energy Center will rely on wastewater generated from Southern Nevada Correctional Center as the primary water source; an existing LVVWD well that produces high levels of total dissolved solids is not suitable for domestic use, but has been proposed by the proponent for use as a back-up water supply for the Ivanpah Energy Center. Therefore, impacts to groundwater that would be associated with plant operations are considered to be negligible.

Groundwater resources in Sandy Valley would not be affected because all water

sources and uses would be confined to the Ivanpah Valley. Furthermore, Diamond Generating has indicated that they have withdrawn their applications for groundwater withdrawals from Sandy Valley.

Concerns regarding water application in Sandy Valley.

Drainage within the plant site is limited due to its location in a partially closed basin. Due to limited drainage area, flooding is not anticipated. Furthermore, the facility is several miles from proposed drainage facilities that are identified in Clark County Flood Control District's Master Plan.

Access Roads

Water requirements associated with construction of the northern or southern access roads would be short-term and related to dust control. Potable water from area wells or the LVVWD is likely to be used; however, potential impacts to groundwater would be negligible.

Water Treatment Plant

Water requirements associated with the construction of the water treatment plant would be short-term and related to dust control. Potable water from area wells or the LVVWD is likely to be used; however, potential impacts to groundwater would be negligible.

Water Supply Pipeline

Water requirements associated with construction of the water supply pipeline would be short-term and related to dust control. Potable water from area wells or the LVVWD is likely to be used; however, potential impacts to groundwater would be negligible.

Transmission Lines

Water requirements associated with construction of transmission lines would be short-term and related to dust control. Potable water from area wells or the LVVWD is likely to be used; however, potential impacts to groundwater would be negligible.

Clean Water Act—Section 404 Permit

The project site, access roads, water supply pipeline, and transmission lines are located within Ivanpah Valley and Eldorado Valley which are closed basins. All project areas drain to Roach Dry Lake, Jean Dry Lake, or Eldorado Dry Lake, which are playas. Drainages do not cross state lines and the areas are not used for interstate commerce. Therefore, none of the areas are considered to be jurisdictional waters of the United States and a Section 404 (wetlands) permit is not required for construction. In a letter dated July 1, 2002, the U.S. Army Corps of Engineers (St. George, Utah office) confirmed that the ephemeral washes potentially affected by the project are non-navigable, intrastate, and isolated; and therefore, would not be considered Jurisdictional Waters of the U.S.

The State of Nevada (Division of Environmental Protection) will be responsible for a Clean Water Act (CWA) Section 402 National Pollutant Discharge Elimination System (NPDES) Stormwater Permit for construction activities. The State of Nevada also will be responsible for CWA Section 401 water quality certification.

5.1.3 Biological Resources

Summary of Impacts Related to Biological Resources	
Significance Criteria: Loss of a unique biological community. Impacts to Category A or Category B desert tortoise density areas. Reduction of a plant or animal community/population that would severely jeopardize the continued existence of such a plant or animal community/population. Introduction of noxious weeds to a presently uninfested area. Violation of the Endangered Species Act, the Bald Eagle Act, the Migratory Bird Treaty Act, or Nevada State Law. Substantial interference with the movement or nesting of migratory species.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Permanent (life of the project) loss of approximately 30 acres of desert habitat. Temporary loss of 10 acres for plant site laydown and 0.8 acres for telecommunications line installation. Significant impacts to the desert tortoise (Category B habitat). Negligible to moderate impacts to vegetation resources and other wildlife species.	Revegetation of temporary use areas only would take place in accordance with BLM restoration plans. Noxious weed control. Mitigation to avoid a "take" of desert tortoise.
Access Roads: North Access Road - permanent (life of the project) loss of approximately 2.7 acres of habitat. South Access Road – temporary loss of 2.6 acres of habitat. Significant impacts to desert tortoise (Category B habitat). Moderate impacts to *Penstemon spp.*, other plant species and wildlife.	Road construction would be minimized to the extent practicable. Access culverts across northern access road to reduce impacts related to habitat fragmentation. Noxious weed control. Mitigation to avoid a "take" of desert tortoise.
Water Treatment Plant: Negligible long-term impacts from loss of 0.7 acres of habitat at the plant site. Negligible impacts to desert tortoise and other species of concern.	Disturbance to habitat would be minimized to the extent practicable. Disturbed areas would be restored in accordance with BLM's approved restoration plan. Noxious weed control. Mitigation to avoid a "take" of desert tortoise.
Water Supply Pipeline: Temporary disturbance to 53 acres of habitat, primarily west of I-15. Significant temporary impacts to desert tortoise west of I-15; moderate temporary impacts to desert tortoise east of I-15. Moderate impacts to *Penstemon spp.*	Revegetation would take place in accordance with BLM restoration plans. Noxious weed control. Mitigation to avoid a "take" of desert tortoise.
Transmission Line: Moderate temporary loss of habitat to as much as 228 acres during construction. Moderate permanent (life of the project) loss of 9 acres of habitat. Significant impacts to desert tortoise west of I-15 (Category B habitat); moderate impacts to the species east of I-15 (Category C habitat). Moderate impacts to other species of concern, vegetation, and wildlife species.	Concentrations of sensitive plant species would be spanned, to the extent practicable. Revegetation would take place in accordance with BLM restoration plans. Avoidance of construction within the McCullough Range during lambing season. Avoidance of helicopter overflights across McCullough Range uplands. Noxious weed control. Mitigation to avoid a "take" of desert tortoise.

Construction of the Ivanpah Energy Center at the Goodsprings Site and related project components (telecommunications line installation, access roads, water treatment plant, water supply pipeline, and transmission lines) would directly and indirectly affect biological resources in the area. Construction activities would result in loss of vegetation through soil compaction and crushing. Although restoration would be carried out in accordance with BLM stipulations (refer to Appendix E) the extent of impacts would persist for several years following revegetation and site restoration actions. Restoration plans would likely include salvaging and replanting of all barrel, cottontop, and hedgehog cactus that would be impacted during construction. Yucca (including Joshua trees and Mojave yucca) and other cacti (including prickly pear and pencil) that are over one-foot tall that would be impacted also would be salvaged and replanted.

Construction activities and related noise and activity would temporarily result in the displacement of wildlife in the area. If such activities were to take place during avian nesting seasons, nesting success could be reduced. Similar impacts to bighorn sheep could result if construction through the McCullough Range were to take place during the lambing season.

Construction of all project components west of I-15 would significantly impact the desert tortoise. Lands west of I-15 are considered to be Category B density habitat for the species and species numbers are considerably more dense than those east of the interstate; lands east of the interstate are considered to be Category C habitat. Some project components that are west of the interstate also are within the Desert Tortoise Translocation Area and could contribute to jeopardizing the success of the translocation program. Approximately 36 acres of Category B desert tortoise habitat would be permanently taken as a result of the project; an additional 78 acres of Category B desert tortoise habitat would be temporarily taken. Although temporarily affected areas would be revegetated in accordance with BLM guidelines, effects of land disturbance are likely to persist for several years.

Project elements that are associated with Category B density desert tortoise habitat are summarized (in acres) as follows:

Acres of Category B Desert Tortoise Density Habitat

	Permanent	Temporary
Goodsprings Plant Site	30.0	10.0
Natural Gas Supply Pipeline	- 0 -	- 0 -
Telecommunications Line	- 0 -	0.8
North Access Road	2.7	- 0 -
South Access Road	- 0 -	2.6
Water Supply Pipeline[1]	- 0 -	31.6

	Permanent	Temporary
Transmission Line Pole Site Work Areas[2]	- 0 -	22.5
Transmission Line Pulling & Tensioning[3]	- 0 -	10
Transmission Line Access Roads	2.7	- 0 -
Transmission Line Spur Roads	0.8	1.0
Total Category B Acres	36.2	78.5

[1] 34,460 linear feet, including 6,560 linear feet for plant site access
[2] Approximately 49 structures, 20,000 ft^2 each.
[3] 15 Pulling & tensioning sites (including 10 sites for plant site access.

Although mitigation measures will be taken to reduce impacts to the desert tortoise or to avoid an incidental "take" of the species (by crushing), soils will be compacted and disturbed during construction and/or during routine maintenance of transmission lines. Planned improvements to the permanent northern access road also could result in increased casual use traffic within the area by the public, which could further contribute to the potential for an incidental "take" of the species over the life of the project.

Long-term impacts are likely to result from fragmentation of habitat at the plant site where north-south movement of the species will be at least partially blocked. Similar habitat fragmentation could result from construction and continuous maintenance of required tortoise fencing around the plant site and along the northern access road. Although noise and vibration effects on the species is not well known and estimates of low frequency noise from the facility could not be made, the long-term presence of low amplitude noise from continuously operating facilities could contribute to disrupting behavior characteristics of the species.

Development of the plant and related components also could contribute to the introduction of non-native noxious weeds and other undesirable plant species during and following construction. Increases in non-native noxious weeds is particularly important within the Category B habitat because the area is not used for grazing, major off-road events, or similar activities that are known to contribute to the introduction of such species. The introduction of noxious and other non-native plant species could, over time result in a displacement of native vegetation.

Construction of various project components could impact migratory birds and other avian species. Impacts to avian species could be ameliorated by scheduling land clearing activities to avoid the nesting season. Field investigations may be necessary prior to construction to determine the presence or absence of nesting birds.

Proposed Goodsprings Plant Site

Construction and operation of the Goodsprings Ivanpah Energy Center (including the telecommunications line) would result in impacts to biological resources within the plant site, and some adjacent areas. The extent of such impacts

would include 30 acres that would be taken for plant site construction and an additional 10 acres that would be used as a temporary laydown area. Installation of a telecommunications line would result in temporary impacts to an additional 0.8 acres of native desert habitat.

Impacts to Vegetation Resources

Lands used for the Ivanpah Energy Center and telecommunications line would result in long-term and short-term disturbance to mixed scrub-mixed succulent habitat. Dominant species that would be lost as a result of construction include: Mohave yucca, ratany, several species of cholla, Joshua tree, and barrel cacti. Overall impacts to the regional availability of such resources would be moderate because they can be quantified. Areas that would be temporarily disturbed would be restored in accordance with BLM's approved restoration plan following construction and prior to returning the use of the land to the BLM. Restoration would be considered to be successful when the composition of species within revegetated areas reach 60 percent or more of unaffected adjacent areas.

Impacts to Wildlife Resources

Land clearing and grading would result in the displacement of wildlife due to noise and activity. Mitigation measures that could be taken to reduce the displacement effects on wildlife include limiting of work site and road grading to the extent practicable and maximizing the use of overland trails and existing roads. Clearing of brush should take place during the late-summer through winter to avoid impacts to nesting avian species.

Permanent and temporary loss of vegetation that would be associated with plant construction could result in impacts to nesting avian species, including migratory birds. Project development can potentially impact nesting avian species that are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712), as amended. Migratory birds, as well as permanent resident species, are known to nest in the project area during early spring through early summer. Some long-term (life of the project) loss of nesting habitat would result from construction of the Ivanpah Energy Center, northern access road, and water treatment plant; additional (but shorter term) loss would result from temporary disturbance within other areas. The extent of such impacts would result from modifications to native vegetation that could directly or indirectly affect mortality rates and/or reproductive success or changes that could affect predation of specific species. Indirect impacts also would result from construction activities on lands that are adjacent to nesting sites. Although impacts associated with long-term and short-term loss of habitat cannot be avoided, impacts to nesting species would be reduced through scheduling clearing and earth moving activities to avoid the early spring through early-summer nesting periods. Long-term and short-term impacts that would result from project development or operation is likely to result in a negligible impact to migratory species as a whole, when compared to overall habitat availability in the area.

A 100- by 200-foot (0.46 acre) retention pond is planned to be constructed within the Ivanpah Energy Center property boundaries. Waters entering and retained within the pond would originate as runoff from the 30-acre plant site as a result of precipitation. Long-term presence of water within the pond is not anticipated due to

arid conditions, low humidity, and low rainfall conditions that are characteristic of southern Nevada. Furthermore, water that would be present within the pond during rare occasions would represent an unreliable water source for birds and rodents when compared to water availability from landscaping and maintenance activities associated with area casinos and residential areas in Goodsprings. Although some avian species may be attracted to runoff waters within the retention pond, access by other wildlife would be largely precluded by fencing. Due to the ephemeral nature of the retention pond and fencing around the plant site, impacts to wildlife are expected to range from none to negligible.

Bighorn Sheep that are known to be relatively abundant on Table Mountain would be several miles west of the proposed plant site. Construction or operation of the Ivanpah Energy Center is not expected to result in an impact to Bighorn Sheep herds.

Threatened, Endangered, and Sensitive Species

The proposed Goodsprings Plant Site and temporary laydown area, permanent and temporary transmission line access roads and work areas, telecommunications and water supply pipeline, and other project components would be within desert tortoise (*Gopheris agassizii*) habitat. Construction activities are likely to result in immediate, but short-term impacts to the species; additional long-term impacts are likely to result during, and following the 30-year life of the project.

The desert tortoise is listed by the U.S. Fish and Wildlife Service (USFWS) and the BLM as a threatened species; the State of Nevada lists the species as protected under NRS 501. The Nevada Natural Heritage Program ranks threats and/or vulnerability to the species as a Global Rank Number 4 (vulnerable to extinction). The species also is protected under the Clark County Multiple Species Habitat Conservation Plan (MSHCP) which has been developed through corporative agreement with the county and state and federal agencies for the protection of federally-listed and other sensitive species. A biological assessment (BA) is being prepared and will be submitted to the USFWS as part of formal consultation under Section 7 of the Endangered Species Act of 1973, as amended. The BA will be used as a basis from which the USFWS will issue a Biological Opinion (BO), which will include reasonable and prudent measures that can be taken to avoid or minimize impacts on the desert tortoise. A remuneration fee of approximately $630 per acre will be assessed through the MSHCP to the project proponent as a means to partially offset unavoidable impacts to the desert tortoise.

Loss of desert tortoise habitat and the decline in population numbers has been documented over several decades. Information obtained from NatureServe Explorer (2002) indicates that habitat in California has been reduced approximately 50 to 60 percent since the 1920s and that populations of western Mojave population in California have declined nearly 90 percent since 1940, and as much as 70 percent from 1976 to 1984. More recent estimates indicate that the Mojave Desert population is declining at a rate of 4.6 percent annually. Incidental "take" of desert tortoise that is related to construction equipment activity in Clark County has been estimated to range from

200 to 300 annually (Southern Nevada Environmental, Inc., 2001).

Although the species is widespread throughout much of the southwest and Mexico, population declines that were observed during the 1970s resulted in concern for its continued existence. The USFWS initiated a review of the status of the desert tortoise to determine if it should be listed as either threatened or endangered (Federal Register, Vol. 43, No. 164, August 23, 1978). Critical habitat for the Beaver Dam slope (Utah) population of the desert tortoise was proposed by USFWS during December 1979 (Federal Register, Vol. 44, No. 237, December 7, 1979) and on August 20, 1980, the species was officially listed by the agency as threatened.

The need for additional critical habitat areas was noted during 1984 when members of the Defenders of Wildlife, the National Resources Defense Fund Council, and the Environmental Defense Fund petitioned the USFWS to upgrade the listing from threatened to endangered and expand the range of coverage to include Arizona, California, Nevada, and Utah. The notice of petition findings and review was published by USFWS during April 2, 1985 (Federal Register, Vol. 50, No. 63, April 2, 1985). During December 1985, the USFWS announced that it would evaluate expanding the range as petitioned; however, it was not until 1989 when an emergency rule was issued that extended the range to include the Mojave population. Although desert tortoise populations were known to be declining, the 1989 emergency rule (Federal Register, Vol. 54, No. 149, August 4, 1989) was initiated as a result of the discovery of a virulent desert tortoise upper respiratory disease syndrome (URDS) that was identified as causing significant declines in certain tortoise subpopulations and which threatened to become pandemic in subpopulations that were already stressed as a result of habitat degradation, predation, and other factors. The emergency rule gave protection to the Mojave Population for a period of 240 days, during which time the USFWS evaluated the situation.

During April 1990, the USFWS issued its final rule regarding the species. As stated in the April 2, 1990 issue of the Federal Register (Vol. 55, No. 63) coverage of the desert tortoise as a threatened species included "... all tortoises north and west of the Colorado River in California, southern Nevada, southwestern Utah, and northwestern Arizona." The ruling stated that construction projects such as roads, housing developments, energy developments, and conversion of native habitats to agriculture have destroyed habitat supporting tortoises in the Mojave population. Grazing and off-road-vehicle use also had contributed to additional habitat degradation. The final ruling also stated that the continued existence of the Mojave population also was threatened by illegal collection, URDS, excessive predation of juvenile tortoises by common ravens, and other factors.

Although the agency acknowledged that additional research was needed regarding species declines and URDS, precipitous reductions in numbers during recent years mandated the need for immediate action. The agency also noted that although relatively large numbers of individuals were known to be in existence, continued existence of the species was threatened (regardless of total numbers currently present) due to habitat loss and degradation, the apparent prevalence of

URDS, and predation of juvenile by ravens. Furthermore, the agency noted that although many factors that were related to the decline in numbers are beyond human control, the agency is obligated to protect all species that are in danger of extinction, to the extent practicable.

Other factors that are believed to contribute to desert tortoise morbidity and mortality appear to be related to concentrations of heavy metals, including cadmium, mercury, lead, molybdenum, arsenic, selenium, chromium, and nickel that becomes concentrated in the liver and kidney (Domico et al., 2001; Chaffee and Berry, 1999; Chaffee and Berry, 2000). The presence of such elements has been linked to mining operations and other human activities.

Protection under the Endangered Species Act of 1973, as amended is codified in 50 CFR 402. Section 7(a)(2) of the Act requires Federal agencies to insure that activities that they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the USFWS. Consequently, a Biological Assessment (BA) is being prepared for submittal from the BLM to USFWS. When complete, the BA will be reviewed by USFWS, which will issue a Biological Opinion. A copy of the Draft BA is provided in Appendix F.

Clark County, the USFWS, the BLM and other cooperating agencies have taken action to reduce potential impacts to the desert tortoise that are attributed to habitat loss, conflicts with vehicles along highways and roadways, vehicular traffic within desert tortoise habitat, vandalism, predation of young tortoise by ravens, and the introduction of noxious weeds and other undesirable plant species.

Clark County and cooperating agencies have been operating the 20,000-acre large scale translocation site (LSTS) (also referred to as the Translocation Area) that is located west of I-15, in Ivanpah Valley. To date, approximately 3,800 desert tortoise have been released, in an effort to bring population numbers to pre-decline levels (Burroughs, 2002). All desert tortoise are screened to detect the presence of URDS prior to release; only disease-free tortoise are released. Although research is ongoing, the LSTS and related programs are considered to be major contributing factors leading to protection of the species and rebuilding of species numbers.

Potential impacts to the species that would be directly or indirectly attributed to the Ivanpah Energy Project (regardless of plant site location) include:

- direct short-term and long-term loss of habitat;
- direct loss of individuals (primarily by crushing) due to construction activities;
- direct loss of individuals (primarily by crushing) during operations and maintenance;
- introduction of competing non-native vegetation (including noxious weeds) during, and following construction;
- Increased off-road vehicle use and vandalism due to increased site access;

- increased predation by ravens; and
- fragmentation of habitat.

The proposed Goodsprings Plant Site is within moderate density desert tortoise habitat and the species is known to be in the area. The desert tortoise is associated with creosote bush scrub in sandy, gravel soils at elevations that are typically below 5,000 feet above mean sea level (ft amsl). Although the plant site is not within the Desert Tortoise Translocation Area, it is at an elevation of approximately 3,400 ft amsl and an area that is considered to be within Category B habitat, which supports moderate densities of desert tortoise.

Field investigations were carried out within the 30-acre plant site and 10-acre temporary laydown area to determine the presence of desert tortoise, kit fox, and other Species of Concern. Results of the investigations indicate three active desert tortoise burrows and one kit fox burrow are located within the 40-acre area.

Impacts to the desert tortoise and proximity of the proposed project to the Desert Tortoise Translocation Center.

Seven active desert tortoise burrows, eight abandoned desert tortoise burrows, and 3 kit fox burrows are within 500 feet of the plant site western boundary. Based on findings, it appears that desert tortoise and kit fox favor the relatively steep slopes along the base of the mountain west of the plant site.

The Goodsprings Plant Site would be cleared desert tortoise and desert tortoise fencing would be installed prior to construction activities. Desert tortoise fencing would be monitored, maintained, and repaired as necessary during construction and plant operation, which would reduce, but not preclude impacts to the species. Although mitigation measures would be taken to minimize impacts to desert tortoise, the permanent loss of approximately 30 acres and temporary loss of approximately 10 acres of Category B habitat that would result from plant construction is expected to represent a significant impact to the species. Furthermore, it is likely that an incidental "take" would occur during the life of the project and construction of the facility would largely restrict north-south free movement of the species, thus contributing to a fragmentation of available habitat. Therefore, due to loss of habitat, the potential for a "take," and fragmentation of habitat, significant impacts are anticipated.

Access Roads

Construction of the northern access road would result in permanent (life of the project) impacts to biological resources. Modifications to an existing trail that would be improved for project use during construction would result in temporary impacts to biological resources.

Impacts to Vegetation Resources

Construction of the paved (northern) access road would result in the long-term loss of approximately 2.7 acres of relatively undisturbed desert habitat during the life of the project. Short-term impacts to 2.6 acres of desert habitat would be associated with improvements to the southern access road. Although mitigation measures would be carried out to avoid direct impacts to native vegetation, moderate impacts are expected.

Impacts to Wildlife Resources

The loss of more than five acres of habitat and increased vehicle activity along plant site access roads would result in moderate impacts to avian species. However, the magnitude of impacts could be ameliorated if clearing and roadway improvements were to be carried out during non-nesting periods. Under such circumstances, related impacts would be considered to range from none to negligible. Other impacts to common reptilian and mammalian species are likely to be negligible.

Bighorn sheep are not in the vicinity of the north or south access roads and construction or use of the roads would not impact the species.

Threatened, Endangered, and Sensitive Species

Improvements to the northern access would include widening and straightening of the existing 10-foot-wide road to a total of 26 feet (including three-foot-shoulders). Minimal improvements would be required along the southern access road. Blading would not be required along County Road 28 or the southern portion of County Road 53Y which are currently maintained to a width of 18 to 20 feet.

Improvements to the northern access road would result in direct impacts to *Penstemon bicolor bicolor* populations that are along the road margin; although the species was not observed to be present along the temporary southern access road during 2002 field investigations, it is likely to be present in some isolated locations. Therefore, some individuals may be eliminated along the margin of the southern access road that would be temporarily widened. The magnitude of impacts was considered to be moderate, but could be reduced through the collection of seed material prior to construction and reseeding following construction.

Field investigations that were carried out along the northern access road indicate that seven active desert tortoise burrows, 12 inactive desert tortoise burrows, and one kit fox burrow are along the 1.5-mile-long portion of the road that would improved by grading and paving. The burrows are somewhat more dense near the southern portion of the roadway, near the proposed plant site, but relatively evenly distributed along the remainder of the road.

Field investigations along the southern temporary access road indicate that active and inactive desert tortoise burrows are relevantly evenly distributed along County Roads 28 and 53Y; densities along the 14,000-foot-long trail that would be improved to facilitate access were slightly higher.

Nine active and 11 inactive desert tortoise burrows were observed along the trail; one live tortoise and three kit fox dens also were observed. Impacts to desert tortoise habitat would be significant, although loss of individuals as a result of construction would be minimized, to the extent possible.

Impacts to the species are expected to be significant due to Category B density habitat loss, incidental "take" as a result of increased vehicular movement during construction and during plant operations, fragmentation of habitat, and the potential introduction of noxious weeds. Incidental "take" related to vehicle traffic along the northern access road could be minimized through management and monitoring plans

that would be followed during construction. Post construction mitigation also could include instillation and monitoring of desert tortoise fencing along the roadway. Potential impacts associated with habitat fragmentation (primarily as related to desert tortoise fencing) along the northern access road could be ameliorated through the installation of culverts under the roadway, which also would facilitate drainage through the area. Potential impacts related to the introduction of noxious weeds would be reduced through implementation of a noxious weed control plan, as described on page 5-42.

Water Treatment Plant

Installation of a water treatment facility near the SNCC would result in the permanent (life of the project) loss of 0.7 acres of habitat. Operation of the water treatment plant and the use of treated water at the Ivanpah Energy Center would reduce the flow of gray water to SNCC rapid infiltration basins.

Impacts to Vegetation Resources

Construction of the water treatment plant would result in the loss of 0.7 acres of creosote bush-white bursage plant community. Dominant species within the community include creosote bush, white bursage, big galleta grass, white burrobrush, several species of cholla, ratany, and Russian thistle. Impacts to the community were determined to be moderate because they can be quantified.

Impacts to Wildlife Resources

Although the availability of water within the RIBs is generally beneficial to avian species in the area, when compared to other water sources in the Jean area such as those associated with, landscaping and lawn maintenance, it is inconsistent and of low quality. The use of gray water for the Ivanpah Energy Project would result in a reduction of gray water to the basins; however, affects on wildlife cannot be quantified.

The Ivanpah Energy Center would require approximately 25 percent of maximum flows from the SNCC. If the water treatment facility were required to process the total flows from the SNCC, excess flows of processed water would be discharged to the SNCC RIBs. Under such circumstances, waters entering the RIBs would be of higher quality than that currently available, which would likely result in beneficial impacts to wildlife.

Threatened, Endangered, and Sensitive Species

The water treatment plant would be located in Category C desert tortoise habitat and all three potential plant sites are in areas that have been, or periodically are impacted by human activity. Consequently, development of any of the three sites is likely to result in negligible to moderate impacts to the desert tortoise.

Water Supply Pipeline

Construction of the water supply pipeline would result in impacts to biological resources along the west side of the UPRR ROW and through the Desert Tortoise Translocation Area, west of I-15.

Impacts to Vegetation Resources

Construction of the water supply pipeline would result in the temporary loss of approximately 53 acres of disturbed and undisturbed habitat along the 10.9-mile-long alignment. Impacts to vegetation

resources can be quantified and were considered to be moderate.

Impacts to Wildlife Resources

During construction, impacts to avian species can be reduced by scheduling ROW clearing to avoid the nesting season. Under such circumstances, related impacts to wildlife are likely to range from negligible to moderate. Although loss of creosote bush-white bursage habitat would be temporary, impacts to nesting avian species are likely to be moderate during several years, prior to completion of restoration activities.

Bighorn sheep are not known to be in the vicinity of the proposed water supply pipeline route and construction of the pipeline would not impact the species.

Threatened, Endangered, and Sensitive Species

A population of *Penstemon bicolor bicolor* was observed to be present along a 500-foot-long segment of the proposed pipeline corridor west of I-15. Construction through the area would eliminate an undetermined number of the plants within the 0.5-acre area that would be temporarily disturbed during construction. Although moderate impacts would result due to construction, the severity of impacts could be ameliorated by pre-construction seed collection and post construction reseeding techniques.

Installation of the water supply pipeline would result in temporary impacts to approximately 21 acres of Category C desert tortoise habitat east of I-15 and approximately 32 acres of Category B habitat west of the interstate. Although impacts to the species that would result from construction of the pipeline east of I-15 are likely to range from none to negligible, those west of the interstate would be significant. Site clearing and monitoring that would be carried out prior to construction would reduce (but not eliminate) the potential for an incidental "take" of the species. Furthermore, impacts to habitat are likely to persist for several years following construction and restoration activities and construction activities could introduce undesirable plant species (including noxious weeds) to the area. Measures that would be implemented to control the introduction of noxious weeds are addressed on page 5-42. Construction of a water supply pipeline around the toe of the mountain west of the plant site (as described in Options 2 and 3) are likely to result in slightly greater impacts to desert tortoise than that of Option 1 (across the mountain). Furthermore, approximately 4,225 linear feet of Option 3 would cross Desert Tortoise Translocation Area. Overall impacts to desert tortoise populations due to water supply pipeline installation are expected to be significant, regardless of option selected due to the loss of habitat, potential take of individuals due to vehicle activity, and potential introduction of noxious weeds.

Construction of the water line across the mountain (Option 1) also are more likely to result in impacts to the banded gila monster (*Heloderma suspectum cinctum*) and western chuckwalla (*Sauromalus obesus*) than would result from options that are south of the mountain. Although habitat is present to support both species along the alignment across the mountain, direct impacts that would result in the elimination of one or more individuals are unlikely.

The banded gila monster (*Heloderma suspectum cinctum*) is listed as a federal

Species of Concern and is protected under state law. The species is known to occur in gravelly and sandy soils with shrub coverage and is typically found under rocks, in burrows of other animals, and in holes that it digs itself. Although not observed during the May – June field investigations, it would most likely be present in rocky alluvium of the McCullough Range and Crystal Pass, near the Table Mountain Substation site. Construction of the transmission line through the McCullough Range and Crystal Pass could result in impacts to the species; however, actual impacts to the species cannot be determined because species presence and numbers are not known.

Western chuckwalla (*Sauromalus obesus*) is a federal Species of Concern and a BLM Nevada Special Status Species. Although not observed during the May – June field investigations, it is likely that the species is present on rocky hillsides with rocky outcroppings where boulders and fractured rocks provide shelter. Chuckwalla sign (i.e., scat) was observed in the Crystal Pass area, on Mira Mountain (west of the Goodsprings plant site), and in the McCullough Range. Construction of the transmission line through Crystal Pass and the McCullough Range could impact the species; however actual impacts to the species cannot be determined because species presence and numbers are not known.

Transmission Lines

Potential impacts to biological resources are similar among the two transmission line alternatives that were retained for further consideration. Linear distances crossed by Alternatives C and E differ by 1,600 feet, which represents approximately 0.7 percent of their total length of approximately 251,000 linear feet. Permanent (life of the project) impacts related to construction of the transmission line would affect less than 10 acres. Temporary impacts related to construction are expected to total approximately 228 acres. Approximately 177 acres would be temporarily disturbed within the ROW; 33 acres would be temporarily disturbed outside of the ROW for pulling and tensioning and creation of spur roads. An additional 18 acres would be temporarily disturbed outside the ROW for laydown areas within sites that have been previously impacted by industrial activities or areas that have been cleared for industrial or mining use.

Impacts to Vegetation Resources

Due to its the relative abundance, impacts to the Creosote Bush – White Bursage vegetation community would be greater than those of other communities; construction of Alternative C or E would impact approximately 108 or 135 acres, respectively. Acreages affected within other vegetation communities would be similar, regardless of alternative selected. Relative impacts to vegetation communities (expressed in acres) for the two alternatives are provided in Table 5-5.

Moderate short-term and long-term impacts to vegetation communities are expected.

Table 5-5 Relative Impacts to Vegetation Communities

	Alternative C		Alternative E	
Corridor Segments	10, 20, 30, 50, 60, 90, 120, 140		10, 20, 30, 50, 60, 90, 110, 130, 140	
	Length (ft)*	Acres**	Length (ft)*	Acres**
Total Length (ft)*	252,260		250,660	
Creosote Bush-White Bursage	122,600	108	153,100	135
Mixed Scrub – Mixed Succulent	58,860	51	58,860	51
Blackbush	5,000	4	5,000	4
Desert Saltbush	34,800	30	20,200	18
Stabilized Dune	30,500	27	13,500	12
Saltcedar	500	<1	0	0

*Corridor length in linear feet, Ivanpah-Mead #2, Ivanpah-Table Mountain #1 & #2, and Pahrump-Mead interconnection.

**Calculated from an estimated 220 acres for structure sites, pulling and tensioning, spur roads, and access roads.

Impacts to Wildlife Resources

Construction of transmission lines that would be associated with the proposed Ivanpah Energy Center would displace wildlife in the area. Although some habitat would be permanently lost, impacts from construction activities would result in temporary, but moderate, displacement of many species. Potential impacts to avian species could be reduced through scheduling of clearing activities to a avoid nesting periods. Resultant impacts to migratory birds are expected to be moderate during the post construction period to a point when restoration is considered to be complete.

Transmission line structures and conductor distances will be designed in compliance with raptor protection requirements, thus precluding potential electrocution of large avian species. Therefore, impacts related to electrocution are not anticipated. The presence of new transmission lines may result in occasional collision with conductors; however, the area crossed by the proposed transmission line alignment is not along a major migration route that is used by raptors or shorebirds. Therefore, potential impacts to such species are not likely to be significant.

The proposed transmission line (regardless of alternative) crosses the McCullough Mountains and an area that is known to provide habitat for desert bighorn sheep (*Ovis canadensis nelsoni*). Although construction activities are likely to result in short-term avoidance of the area by the species, long-term impacts are not expected. Adverse impacts can be minimized by avoiding construction during

the lambing season. Construction of the transmission line through the McCullough Range could impact bighorn sheep in the area. The area that would be crossed is a migration route from the South McCullough Range to the North McCullough Range and the area north of the line crossing is frequently used for lambing. If construction were to be restricted to the spring through early-fall (April through October) the severity of potential impacts could be reduced. The use of helicopters for construction should be restricted to avoid overflights north or south of the pass to avoid impacts to sheep north and south of the pass. Under such circumstances, impacts to the herd would not be significant.

Impacts to BighornSheep.

Threatened, Endangered, and Sensitive Species

Construction of the transmission line (regardless of alternative) would impact populations of *Penstemon bicolor bicolor* that are known to be present along Segment 30 which crosses the Desert Tortoise Translocation Area and populations of white-margined beard-tongue (*Penstemon albomarginatus*) that are present near the site of the proposed Ivanpah Airport.

Based on field investigations conducted during spring and early-summer 2001 (the species was not observed during the 2002 field surveys), the new transmission line (Ivanpah-Mead #2) would cross approximately 500 linear feet of *P.b. bicolor*; field investigations carried out during the spring and early-summer of 2001 indicate that approximately 1.75 miles of the proposed transmission line corridor (Segment 50) crosses one population of *P. albomarginatus*. Construction through the area would result in the temporary loss of as many as 200 plants within a 3.5-acre area and a moderate impact to the species. A population of *P.b. bicolor* also was observed along Segment 60, in the McCullough Range. Construction of a two-mile-long segment of the transmission line through the area is likely to result in the loss of some individuals, but would represent a moderate impact to the species.

Actual impacts to the species can be minimized by spanning areas of high plant densities and by maximizing use of existing (previously disturbed) permanent access roads and permanent spur roads that were created as part of construction of the Reliant Bighorn-Arden Transmission Line and the existing Pahrump-Mead Transmission Line. Other mitigation measures also include seed collection prior to construction and reseeding following construction. Although populations of both *P.b. bicolor* and *P. albomarginatus* would be impacted during construction and some individual plants would be destroyed, impacts to both species (as a whole) are expected to range from negligible to moderate.

Although laydown areas have not been identified, potential locations appear to be readily available within areas that have been previously cleared as a result of the Reliant Bighorn to Arden Transmission Line and Mead Substation. A site that is located on private land, southwest of the I-15/SR 161 interchange, was used by Nevada Power Company as a laydown area for the construction of the Reliant Bighorn-Arden Transmission Line is likely to be available for use for the Ivanpah Energy Center project. Other sites that would be available include the temporary laydown area at the Ivanpah Energy Center plant

site and the Quality Earth Minerals mining site near Hidden Valley. Temporary impacts attributed to construction would result in negligible impacts to biological resources on public lands because they would be revegetated and restored in accordance with BLM's restoration plans. Laydown areas on private lands are fenced and absent of wildlife habitat.

Potential impacts to desert tortoise populations are expected to be greater as a result of construction west of I-15 than would occur east of the highway or in Eldorado Valley.

Desert tortoise and kit fox numbers that appear to be along Segment 10 of the proposed Ivanpah-Table Mountain Transmission Line corridor are more common within portions of the route that are in the lower portion of the valley. Eleven abandoned burrows were noted in upland areas, near the site of the proposed Table Mountain Substation. Segment 30 crosses the Desert Tortoise Translocation Area, which is known to have high densities of desert tortoise. Field investigations noted 37 active desert tortoise burrows, 30 inactive desert tortoise burrows, and six kit fox burrows along the 27,900 linear foot segment. Although construction of new transmission lines often result in the creation of new roads and concomitant off-road use, VEA construction practices typically avoid blading of access roads. Therefore, impacts due to improved access (as related to transmission line construction) are not considered to be significant. However, due to relatively high densities (Category B density) west of I-15, the potential for an incidental "take" during construction and/or routine maintenance and the potential introduction of noxious weeds, potential impacts to desert tortoise within the area are expected to be significant.

Numbers of active and inactive desert tortoise burrows that are present along Segment 50 are considerably less than those west of Interstate 15. Four active and 23 inactive burrows were observed along Segment 50, from the vicinity of I-15 to the vicinity of Sheep Mountain, a distance of approximately 25,900 linear feet. Four kit fox dens also were observed along the segment. Due to the low numbers of desert tortoise within the area (Category C density), concomitant impacts were considered to be moderate.

No active desert tortoise burrows were observed along the western portion of Segment 60 from the vicinity of Sheep Mountain to the base of the McCullough; however, 26 abandoned burrows, seven kit fox burrows, and one live tortoise were present. One active and two inactive desert tortoise burrows were observed along the eastern portion of Segment 60, which crosses a broad valley that represents an extension of Eldorado Valley. Due to the low numbers of desert tortoise within the Category C area, concomitant impacts were considered to be moderate.

Relatively few desert tortoise burrows were observed along Segments 90, 110, 130, and 140, which total more than 20 linear miles. A cluster of five active burrows was noted near the western margin of Eldorado and several inactive desert tortoise burrows and kit fox burrows were observed along Segment 130, east of Eldorado Dry Lake.

Construction of the transmission line (regardless of alternative selected) would result in the loss of approximately 220 acres of desert tortoise habitat, primarily

within Creosote Bush–White Bursage and Mixed Scrub–Mixed Succulent vegetation communities. Although mitigation measures would be implemented to avoid direct impacts to individuals during construction, short-term and long-term loss of habitat, potential introduction of noxious weeds, and expanded access could result in significant impacts to the species.

Construction of the new transmission line from the plant site to Mead Substation (Ivanpah-Mead #2) and the line to Table Mountain Substation (Ivanpah-Table Mountain #1 and #2) would result in the installation of single-pole structures and conductor that can be used as perching locations for ravens that prey on young tortoise. However, 100 percent of the alignment would parallel existing transmission lines where similar (i.e., single-pole structures), or better perching locations (i.e., lattice structures) are present. Therefore, the addition of Ivanpah-Mead Transmission Line #2 is not likely to result in increased raven numbers (and consequential, predation on young tortoise) than that which is presently within the area.

Potential impacts related to plant site access Options 1 through 4 indicate greater impacts would be associated with Options 2 or 3 than would result from Options 1 or 4. However, a cluster of active and inactive desert tortoise burrows, several desert tortoise skeletons, several desert fox burrows, and three live tortoises were observed on the upper reaches of the mountain that is west of the proposed plant site. The apparent high density of desert tortoise and kit fox burrows is likely attributed to field investigations that was conducted within a 500-foot-wide, 4,200-foot-long corridor that would be available to accommodate as many as five circuits from the Ivanpah Energy Center to the existing VEA corridor.

Desert tortoise and kit fox numbers that occupy the area that would be crossed by alternative plant site access options across or around the southern toe of the mountain west of the plant site were found to have relatively high numbers of desert tortoise and kit fox burrows; one live desert tortoise, 10 active burrows, and 28 inactive burrows were found along Plant Site Access Option 3.

Construction of as many as three parallel structures across or around the toe of the mountain (Options 2 or 3), would result in greater impacts to desert tortoise habitat than would result from construction of two parallel structures around the toe of the mountain (Option 4) or all structures across the mountain (Option 1). However, regardless of severity, impacts to the species are expected to be significant due to habitat losses, increased vehicular activity, the potential for the introduction of noxious weeds, and because the access options are all within Category B density habitat.

Construction of Options 1 or 4 would have a greater potential of impacting chuckwalla and banded gila monster than construction of Options 2 or 3. However, impacts to the species cannot be determined because species numbers are unknown.

Construction of the Ivanpah-Mead #2 transmission line would cross approximately 13,000 linear feet of crucial Gambel's quail habitat. Impacts to the species could result in a temporary displacement of individuals and nesting failure. Although potential impacts to the species were considered to be moderate, they could be ameliorated by scheduling

construction periods to avoid the spring nesting season.

Other Special Status Species that May Be Affected

The U.S. Fish and Wildlife Service and the BLM list an additional five Species of Concern that were not found during field investigations, but potentially could be in the project area. If present, the species could be affected by project construction.

Rosy twotone beardtongue (*Penstemon bicolor roseus*) is a federally listed Species of Concern that occurs in habitats that closely resemble those of the yellow twotone beardtongue (*P. bicolor*), including calcareous soils in washes, roadsides, rock crevices, outcrops and areas of enhanced runoff at 2,500 to 5,480 ft amsl.– The species was not observed during field investigations.

Although not observed during field investigations, the burrowing owl (*Athene cunicularia hypugea*) is known to be present in southern Clark County, Nevada. The species is listed as a federal Species of Concern and a BLM Proposed Nevada Special Status Species. It is also protected under the Migratory Bird Treaty Act (MBTA). The burrowing owl is one of the smallest owl species and nests in abandoned burrows created by desert tortoises or rodents. Species numbers have been declining due to habitat losses.

Other species of concern that are listed in the Clark County Multiple Species Habitat Conservation Plan (MSHCP) and the Nevada Natural Heritage Program that may be present in the project area include the banded gecko (*Coleonyx variegatus*), desert iguana (*Dipsosaurus dorsalis*), Mojave milkvetch (*Astragalus mohavensis* var. *mohavensis*), Nye milkvetch (*Astragalus nyensis*), and Clokey buckwheat (*Eriogonum heermannii* var. *clokeyi*). However, none of the species were observed during field evaluations that were carried out in the area for the Reliant Bighorn Project (2001) or the Ivanpah Energy Center Project (2002). If such species were to be present in the project area, they could be affected during the construction period.

The Nevada Natural Heritage Program lists the silver-haired bat (*Lasionycteris noctivagans*), long-eared myotis (*Myotis evotis*), and long-legged myotis (*myotis volans*) as species of concern that may be present in southern Clark County. The Nevada Bat Working Group (2002) also lists the spotted bat (*Euderma maculatum*) as a state protected threatened species. A review of habitat and roosting site requirements indicates that it is unlikely that any of the four species would be present in the project area. Habitat requirements for the four species generally includes forested areas at elevations above those of the Ivanpah Valley, Eldorado Valley, or the McCullough Range or riparian areas that would be associated with the Colorado River. Therefore, potential impacts to any of the four species are not anticipated.

The Nevada Bat Working Group (2002) lists several species of bats that typically roost in natural caves, mine shafts, and adits and that are frequently associated with creosote bush, blackbush, and desert scrub habitat. Those species that are most likely to be found in caves, crevices, and abandoned mines in the project area include the pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corymorhinus townsendii*), big brown bat (*Eptesicus fuscus*), California leaf-nosed bat (*Macrotus californicus*), California myotis

(*Myotis californicus*), small-footed myotis (*Myotis ciliolabrum*), Yuma myotis (*Myotis yumanensis*), and the Brazilian free-tailed bat (*Tadarida brasiliensis*). Although construction of transmission lines associated with the Ivanpah Energy Center would require the movement of heavy equipment in the vicinity of several abandoned and active mine sites that are likely to provide roosting sites for bats, impacts to the species are not anticipated.

Special Status Species that are Unlikely to be Affected

Las Vegas bearpoppy (*Arctomecon californica*), white bearpoppy (*A. merriamii*), Spring Mountain milkvetch (*Astragulus remotus*), and sheep fleabane (*Erigeron ovinus*) are federally listed Species of Concern and BLM Nevada Special Status Species that are known to occur in Clark County. Las Vegas bearpoppy is generally associated with gypsiferous soils and gypsum outcrops that are relatively common in the Bird Spring Range. White bearpoppy is generally associated with alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops at elevations from 2,000 to 6,280 ft amsl. Although suitable habitat may exist within the general project area to support the species, it would most likely be found on uplands of the McCullough Range and would not be affected by project development. Spring Mountain milkvetch and sheep fleabane are typically found at elevations above those of the Ivanpah Energy Center project. Spring Mountain milkvetch was last recorded in 1905. Sheep fleabane is most often associated with cliffs and ridgeline outcrops in the pinyon-juniper and montane conifer zones at elevations from 3,600 to 8,400 ft. amsl, which are above those that would be affected by project development.

Noxious Weeds

A weed abatement program would be instituted to prevent the spread of noxious weeds. According to the United States Department of Agriculture, noxious weeds are defined as "species of plants that cause disease or are injurious to crops, livestock, or land, and thus are detrimental to agriculture, commerce, or public health." The Nevada Department of Agriculture is responsible for implementing noxious weed laws (Nevada Revised Statute, Chapter 555.010-555.220). Noxious weeds that potentially could occur in Nevada are addressed in Section 4.3.3 of this document. A weed specialist would be assigned to carry out a weed management plan for the project. The specialist will have:

- experience in native plant taxonomy and identification,
- experience in field ecology and plant community mapping,
- an applicator's license for herbicides, and
- training in invasive weed management.

The Bureau of Land Management will prepare a weed control plan as part of the COM plan. The weed control plan typically includes pre-construction weed inventory and mapping to identify the presence and aerial extent of weed populations; a pre-construction weed treatment plan that could include mechanical, chemical, biological, and/or burning treatment; weed management during construction; and monitoring.

Steps that will be taken to minimize the presence of noxious weeds include:

- the use of certified weed free seed that would be used during restoration,
- high-pressure (air or water) washing equipment would be used to wash heavy equipment that is brought to the project site from out-of-state,
- certification/identification to the BLM that hay or other vegetation grown for use as mulches is weed free,
- certification that gravel and fill sources that would be used for the project are in relatively weed free areas and that the gravel and fill are weed free, and
- that disturbed areas will be promptly revegetated to discourage weeds from becoming established.

Specific procedures to address noxious weeds will be addressed in a Weed Control Plan that will be incorporated into the COM plan.

5.1.4 Cultural Resources

Many of the archaeological sites within the area of potential effect could be affected by construction of the Proposed Goodsprings Plant Site and associated transmission and water lines. Some archaeological sites could experience impacts ranging from minor disturbance to destruction of the site. Impacts (*i.e.*, artifact collection) during construction would be mitigated through data recovery as determined by BLM, in consultation with the Nevada State Historic Preservation Office.

In accordance with Section 106 of the National Historic Preservation Act (NHPA), adverse impacts to sites determined eligible for the National Register of Historic Places (NRHP) would be mitigated through development of a treatment plan, in accordance with the Programmatic Agreement (PA) prepared by the Bureau of Land Management (BLM) in consultation with the Western Area Power Administration (Western), and the Nevada State Historic Preservation Office (SHPO). To evaluate the importance of a cultural resource under the National Historic Preservation Act, certain criteria have been established, which are referred to as Criteria a, b, c, and d. For sites eligible under Criteria a-c, (NRHP 36 CFR 60.4), mitigation other than data recovery may be considered in the treatment plan. For sites determined eligible under Criterion d (information potential), data recovery based on site-specific plans would be the primary means of mitigation. Techniques could include detailed mapping, artifact collections, excavation, documentary research, or oral history interviews. Data recovery, an adverse impact, would culminate in analyses, report preparation, and the curation of collections and records in accordance with the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 CFR 44716-37) and *Treatment of Historic Properties: A Handbook* (ACHP, 1980). No further work would be done at sites determined as not eligible for the NRHP.

It is currently unknown how many archaeological sites exist in the project area. However, before any construction would be allowed, a Class III cultural resources survey would be conducted for the area of potential effect. Pursuant to the PA for the proposed project, BLM would

consult with the SHPO to determine eligibility of any sites identified in the area of potential effect. For the purposes of this analysis, it may be assumed that by following NHPA Section 106 procedures and the PA would mitigate adverse impacts to cultural resources in the project area. Unavoidable impacts to sites that are eligible for nomination to the NRHP would be mitigated through the implementation of a treatment plan in accordance with the PA.

5.1.5 Paleontological Resources

Project personnel reviewed literature on the paleontology and geology of the project area using both published and unpublished reports and papers. A records review of all known fossil localities within one mile of the project boundary also was performed by Harry Reid Center and San Bernardino County Museum personnel. Although results from a review of records at the Harry Reid Center and the San Bernardino County Museum indicate that no significant fossil localities have been found within the project boundaries, or within a one-mile vicinity of the project area, unrecorded sites may be present. Therefore, field investigations will be carried out prior to project construction to determine the presence and importance of sites that may be affected.

Paleontological resources are protected on public lands by federal legislation by the following legislation:

- Antiquities Act of 1906. The Act forbids the disturbance of any object of antiquity on federal lands without a federal permit. The Act also established sanctions for unauthorized appropriation of antiquities.

- National Environmental Policy Act of 1969. The Act requires that important natural aspects of the national heritage be considered in assessing the environmental conesquences of a proposed project.

- Archeological and Historic Preservation Act of 1974. The Act provides for the preservation of historical and archaeological data that may be lost as a result of federal projects or federal actions. It specifically requires a survey for, and protection or recovery of, objects or data of scientific significance that are threatened by construction activities.

- Federal Land Policy and Management Act of 1976. The Act requires that scientific values be addressed in the management of public lands and resources.

It is currently unknown how many paleontological sites exist in the project area; however, a Class III survey will be conducted prior to any construction activity to identify sites that may be affected by the project. Pursuant to the PA for the proposed project, BLM would determine the importance of sites that would be impacted and mitigation procedures that would be required.

5.1.6 Land Use and Zoning

Summary of Land Use/Zoning Impacts	
Significance Criteria: Significant impacts would result if zoning change requests to Clark County cannot be resolved.	
Summary of Impacts	**Mitigation Measures**
Plant Site: The 30-acre plant site would be unavailable for other uses during the life of the project. A 10-acre tract would be used as a temporary laydown area. Moderate impacts are anticipated	Undeveloped BLM lands would require a zoning change. Waivers and variances will be required prior to construction.
Access Roads: Improvements to the northern access road would require 2.7 acres. Blading of the southern access road would require 2.6 acres. Negligible impacts are anticipated.	Improvements would be limited to those that are minimally required for use.
Water Treatment Plant: Permanent use of 0.7acres of State of Nevada Land for the plant.	The plant could be removed and the lands could be returned to the state, following the life of the project.
Water Supply Pipeline: Temporary disturbance of 53 acres, mostly within BLM-designated Utility Corridors. The action would result in negligible impacts.	Most of the pipeline corridor would be co-located within the proposed IEC to Mead Transmission Line Corridor. Temporarily disturbed areas would be restored following BLM's restoration plan.
Transmission Lines: Approximately 228 acres of temporary disturbance and less than 9 acres of permanent disturbance. Transmission line construction would result in negligible to moderate impacts.	Nearly all transmission line corridors would be within BLM-designated Utility Corridors. Temporary disturbance would be limited by maximizing use of existing access and spur roads and by using previously disturbed/cleared laydown areas. Areas that are temporarily disturbed will be restored in accordance with BLM's approved restoration plan.

Construction and operation of the Ivanpah Energy Center at the Proposed Goodsprings Plant Site is not likely to result in impacts to land use or zoning. Although an application has been made to Clark County to permit the plant site and adjacent temporary laydown area for heavy industry, a permit has not been issued. The applicant also has requested, but has not received, variances and wavers for height requirements, landscaping, township/ rangeline avoidance, off-site development requirements, sound requirements, county road abandonment, and setback requirements. However, impacts related to land use and zoning issues are not expected to be significant.

Proposed Goodsprings Plant Site

Land use in Ivanpah Valley and Eldorado Valley is administered through the Clark County and the City of Boulder City. The BLM is responsible for land management

issues under the guidance of the Federal Land Policy and Management Act.

Construction and operation of the proposed Goodsprings Ivanpah Energy Center would require the development of ancillary facilities, improvements to existing county roads, installation of a water supply pipeline, and construction of associated transmission lines. Significant impacts to land uses associated with the proposed actions are not expected.

Approximately 30 acres of permanent (life of the project) disturbance would be attributed to the plant site; an additional 10 acres would be temporarily used as a laydown area. The temporary use areas would be restored to their preconstruction condition (to the extent practicable) and revegetated in accordance with BLM's approved restoration plans and returned to the BLM, following completion of the restoration process.

Will disturbed lands be revegetated?

The 30-acre Ivanpah Energy Center Goodsprings site, 10-acre temporary laydown area, and surrounding lands are on federal land that is zoned Rural Open Land. There are no schools, hospitals, retirement centers, day care centers or similar sensitive receptors in the vicinity of the proposed plant site. The nearest residential structures are approximately 2.0 to 2.5 miles north to northwest of the plant site and north of SR 161 and Sandy Valley Road. The Kern River Gas Pipeline Goodsprings Compressor Station is approximately 2,000 feet to the north and the nearest industrial facility to the plant site.

Development of the plant site would require a zone boundary amendment to convert the 30-acre parcel from Rural Open Land to Heavy Industrial Use Land (M-2). The project proponent also has requested a waiver of development standards and a variance for construction on M-2 land and a permit to vacate and abandon a segment of County Road 53Y. Seven variances and waivers of development standards have been requested from Clark County Department of Comprehensive Planning. Rezoning of the proposed plant site has been requested from Clark County.

Zoning change requests should be appropriately identified.

Construction of the Ivanpah Energy Center would preclude the use of approximately 30 acres of land for other purposes during the life of the project. However, lands that would be occupied by the plant could be restored for alternative uses, following the conclusion of plant operations. Appropriate restoration requirements would meet requirements established at that time.

Height Requirements

Ivanpah Energy Center LP has requested a variance/waver to deviate from Clark County Code, Title 30, Section 30.40.220.b (Standards Applicable to All Manufacturing and Industrial Districts). The variance would permit the construction and operation of turbine exhaust stacks that would be at a nominal height of 150 feet above land surface. The height requirement is needed to meet air quality protection requirements. The variance also would allow construction of two 92-foot high Heat Recovery Steam Generators, which are needed for efficient heat recovery and steam production and a 65-foot-high air-cooled condenser that

would be used to eliminate the need for a water-cooled cooling tower.

Landscaping

A variance from landscaping requirements (Clark County Code, Title 30. Section 30.64 [Site Landscaping and Screening Requirements]) has been requested because the proposed plant location is in an area that would be seldom seen by the general public. Required landscaping would serve little to no useful purpose but would require irrigation.

Township/Range Line Avoidance

A variance from township and range setbacks (Clark County Code, Title 30, Section 30.52.030 [Dedication of Right-of-Way] and Title 30, Section 30.56.040e [Setbacks from Township and Range Lines]) has been requested to place the plant within the desired location. The proposed plant site is located on the Range Line separating Range 58E and Range 59E, Township 25S MDBM. Analyses of topographic relief along the Range Line indicate that construction of a roadway along the alignment would result in excessive grade. Furthermore the plant site is bounded by steep terrain that would require unacceptable cut and fill for site leveling and preparation. Therefore, the waiver has been requested to remove the dedication of 120 feet of width along Township and Range lines and the requirement for a 75-foot setback from the Township and Range Line.

Off-site Development Requirements

A variance from off-site development requirements (Clark County Code Title 30, Section 30.52) has been requested. The variance request was based on the premise that there are no public or private structures or properties that are adjacent to, or near the proposed facility that would be affected by plant construction or operation. Furthermore, the plant is not likely to affect property values of lands in the area or recreational areas in the vicinity of the plant.

Sound Requirements

Octave band noise limitation requirements that have been established by the county (Clark County Code, Title 30, Section 30.68.020 [Noise]) range from 31.5 to 8000 Hz. Based on empirical data, noise levels are not expected to approach 49 dBA limits set for the property boundary. Ivanpah Energy Center LP has requested a variance because estimates of noise intensity cannot be determined for specific octave ranges.

Abandonment County Road 53Y

Due to topographic limitations and plant site configuration, the proposed project site would occupy approximately 2,000 linear feet of County Road 53Y. A variance has been requested to abandon that portion of the county road that would lie within the plant site and reconstruct the road adjacent to the eastern plant property line.

Setback from Non-industrial Uses

Special use applications in M-2 are subject to a requirement for a 1,000-foot setback from non-industrial uses (SLUCM, Code 4800). Although surrounding lands are not used for industrial purposes, the variance request has been made because topographic features surrounding the area largely preclude the use of such surrounding areas for uses that would allow construction of sensitive receptors (*i.e.*, residential structures) and because topographic features place constraints on

the actual plant site. In summary, there simply is not sufficient space within the relatively narrow valley to create a suitable 1,000-foot-wide buffer.

Land use impacts associated with the proposed natural gas supply line or the telecommunications line are expected to be negligible. The natural gas supply pipeline (Application Serial No: N-75474) would be installed between the existing Kern River Pipeline and the plant site, in an area that would be disturbed by plant construction. Installation of the pipeline is expected to result in temporary disturbance to a nominal area. The telecommunications line would extend from an existing telecommunications line (N-75895) that serves the Kern River Gas Transmission Compressor Station. The new communications line would be installed underground adjacent to a portion of the KRGT Goodsprings Compressor Station road and within the shoulder of the proposed northern access road to the Ivanpah Energy Center facility. Impacts related to the installation of the telecommunications line are expected to be negligible because existing land uses would not be affected. Soils and vegetation disturbed as part of installation would be restored in compliance with BLM's approved restoration plan.

Access Roads

Access to the plant site would be from the north along County Road 53Y that extends approximately 7,200 linear feet from SR 161. Approximately 2,000 linear feet of the northern access road have been graded to a width of approximately 20 feet and is routinely used by maintenance and operational personnel for the KRGT Goodsprings Compressor Station. The remainder for the road is approximately 10 feet in width, and would require improvements to facilitate the movement of heavy equipment.

Although detailed engineering analyses would be needed to fully determine the extent of improvements necessary, road alignment modifications would be needed to eliminate a switchback and the remainder of the road would require widening from its present 10-foot width to an asphalt-paved width of 20 feet. New road construction across the switchback would total approximately 500 linear feet. An additional three feet would be needed along both sides of the road for shoulders. Therefore, improvements to the northern access road would require approximately 2.7 acres of currently undisturbed land. The completed road surface (paved area and shoulders) would total approximately 4.7 acres.

A southern route has been identified for use during plant construction. Approximately 19,000 linear feet of the 33,000 linear foot gravel road has been graded to a width of approximately 18 feet and modifications would not be needed. The remaining 14,000 linear feet of the road is narrow (approximately 10 feet wide) and impassable by heavy equipment. Improvements to the 14,000 linear feet would impact land along both sides of the road and directly impact approximately 2.6 acres of relatively undisturbed desert. Therefore, impacts that are related to land use are expected to be moderate.

Water Treatment Plant

Construction of the water treatment facility would require use of 0.7 acres of State of Nevada land and a special use permit from Clark County.

Water Supply Pipeline

The proposed water supply pipeline would extend from the vicinity of the Southern Nevada Correctional Center water treatment plant and water supply Well # 52732/52735 to the plant site. Approximately 12,500 linear feet would be located parallel the UPRR ROW. Remaining areas (approximately 45,060 linear feet) would be co-located within the proposed Ivanpah-Mead Transmission Line #2 corridor.

Construction of the pipeline would require temporary disturbance within a 40-foot-wide area along the 10.9-mile-long corridor. The 53-acre area of temporary disturbance would be revegetated in accordance with BLM restoration plans, following construction.

Three plant site access options have been identified as part of the project. Option 1 would cross the mountain west of the plant site. Option 2 would traverse the southern toe of the mountain and Option 3 would extend around the toe of the mountain, roughly parallel to an existing gravel road. A portion of Option 3 (approximately 4,225 linear feet) would be constructed within the Desert Tortoise Translocation Area.

Land use impacts associated with construction across the mountain and those that would be located around the toe of the mountain are similar. Construction across the mountain would result in temporary impacts to 3.9 acres; construction around the toe of the mountain would impact 6.0 to 6.7 acres. Although land use impacts associated with each of the options would be similar, restoration of lands disturbed across the mountain would likely be more difficult than that of the other options.

Transmission Lines

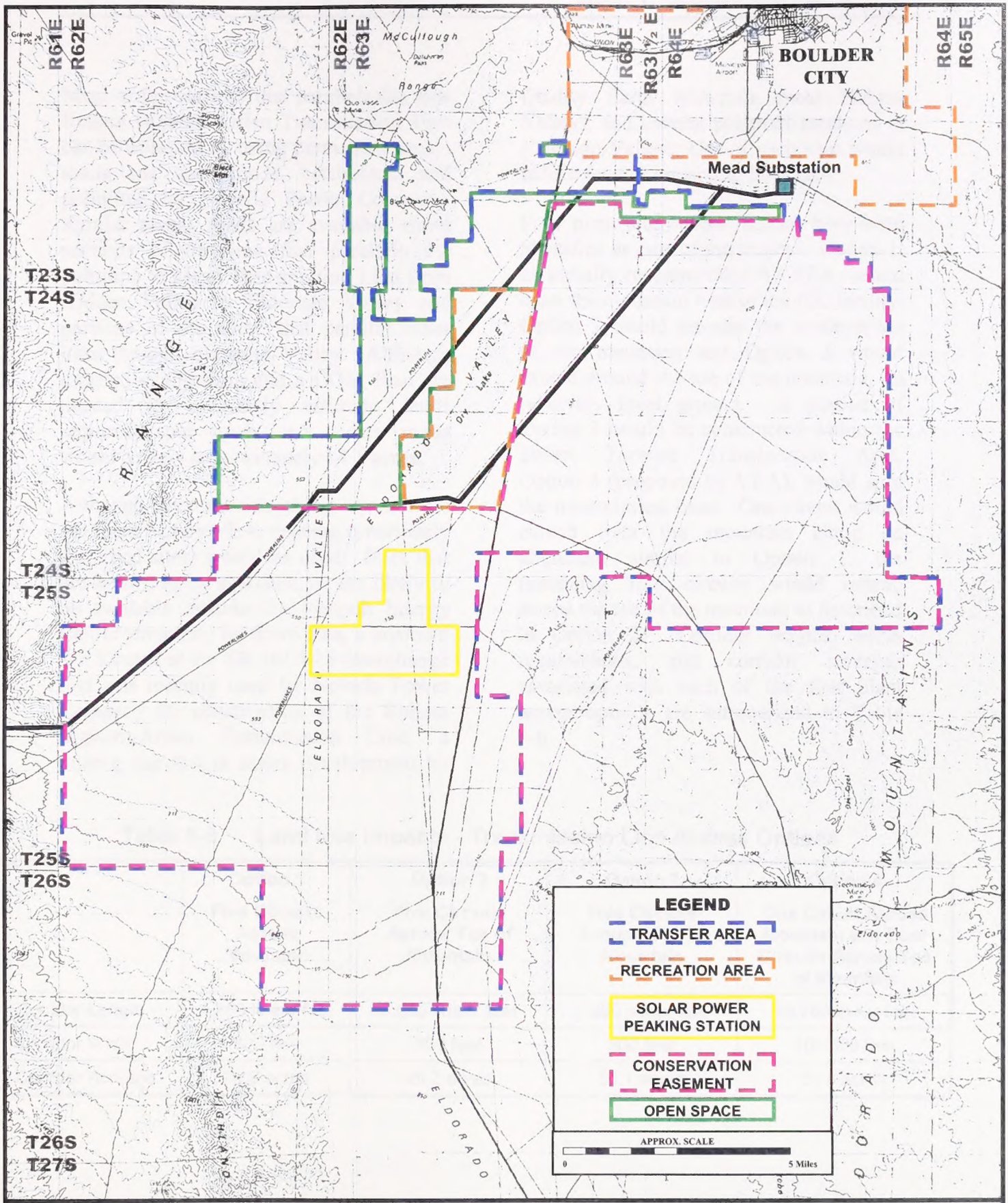
Potential land use impacts associated with construction and operation of transmission lines are similar among both alternatives. The two alternatives range from approximately 250,660 (Alternative E) to 252,260 (Alternative C) linear feet in length. Federal lands crossed by both total approximately 143,360 linear feet. Alternative C would cross approximately 107,900 linear feet of land that is administered by the City of Boulder City; Alternative E would cross approximately 106,300 linear feet of City of Boulder City administered land.

Major differences associated with the two alternatives are associated with lands crossed within the Eldorado Valley (Figure 5-3). Alternative C would cross approximately 6,860 linear feet of designated recreation land, 36,400 linear feet of conservation land, and 39,640 linear feet of open space land. Alternative E would cross approximately 20,400 linear feet of recreation land, 62,700 linear feet of conservation land, and 10,800 linear feet of open space land. Although linear distances of designated recreation, conservation use, and open space lands differ between the two alternatives, both alternatives are largely within designated utility corridors and/or within areas that have high concentrations of transmission lines. Since land use acreages can be quantified, impacts were considered to be moderate.

Permanent and temporary land use impacts associated with construction of Alternative C or E would be similar. Approximately 372-376 single-pole structures would be required for construction of the new transmission line, which, in total, would permanently (life of the project) occupy less than 0.1 acre of land. An estimated 44

pulling and tensioning sites would be required (see Appendix H). Assuming that each site would occupy a 100 by 300 foot area (30,000 ft^2), 2.8 acres would be temporarily disturbed within the ROW and 27.6 acres would be temporarily disturbed outside of the ROW. A 100 by 200 foot area (20,000 ft^2) would be required within the ROW at each structure location, thus resulting in approximately 175 acres of temporary disturbance.

Requirements for spur roads are likely to be minimized through the use of numerous existing roads, although a three to four-mile segment through Crystal Pass to Table Mountain Substation is likely to require blading to facilitate access by heavy equipment. Blading also would be required through the McCullough Range.



PARSONS

IVANPAH ENERGY CENTER PROJECT

FIGURE 5-3
ELDORADO VALLEY DEVELOPMENT AREA MASTER PLAN

Most of the corridor that parallels the new Reliant Bighorn-Arden Transmission Line can be accessed by using permanent access roads and spur roads, established and permitted by Nevada Power Company. Similar access roads are available along portions of the line that parallels the Pahrump to Mead Transmission Line from Hidden Valley to Eldorado Valley and portions of the route that parallel other lines through Eldorado Valley. Although detailed engineering and a COM Plan are needed to accurately estimate lands required, spur roads and access roads would occupy approximately 14.1 acres.

Although temporary laydown areas were not identified by VEA, existing (previously disturbed sites) would be used. Sites that are known to be available, or are likely to be available include the Ivanpah Energy Center temporary laydown area, a laydown site located at the SR 161/I-15 interchange that was recently used by Nevada Power Company for construction of the Reliant Bighorn-Arden Transmission Line, a mining site that is under development by Quality Earth Materials (near Hidden Valley), and several potential locations in Eldorado Valley. Use of such sites would reduce overall impacts to land uses.

Four plant site access options have been identified as part of the project. Option 1, as initially recommended by VEA, would cross the mountain west of the IEC facility. Option 2 would traverse the southern toe of the mountain and Option 3 would extend around the toe of the mountain, on relatively level ground. A portion of Option 3 would be constructed within the Desert Tortoise Translocation Area. Option 4 (proposed by VEA), would split the transmission lines. One circuit would extend over the mountain along an alignment similar to Option 1; the remaining four circuits would extend across the toe of the mountain as described in Option 2. Corridor lengths, width requirements, and corridor acreages associated with each of the four plant access options are summarized in Table 5-6.

Table 5-6 Land Use Impacts - Transmission Line Access Options

	Option 1 Five Circuits Across Mountain	Option 2 Five Circuits Across Toe of Mountain	Option 3 Five Circuits Around Toe of Mountain	Option 4 One Circuit Across Mountain and Four Circuits Across Toe of Mountain
Corridor Length	4,200 linear feet	6,560 linear feet	7,280 linear feet	10,760 linear feet
Corridor Width	300 feet	300 feet	300 feet	100/200 feet
Corridor Acreage	28.9 acres	45.2 acres	50.1 acres	39.8 acres

5.1.7 Rangeland Management

Summary of Impacts Related to Rangeland Management	
Significance Criteria: Irreversible loss of a large portion of available rangeland that would make livestock production economically unviable.	
Summary of Impacts	**Mitigation Measures**
Plant Site: No impact – rangeland not present	No specific mitigation measures required.
Access Roads: No impact – rangeland not present	No specific mitigation measures required.
Water Treatment Plant: No impact - rangeland not present	No specific mitigation measures required.
Water Supply Line: No impact – rangeland not present	No specific mitigation measures required.
Transmission Lines: Negligible temporary disturbance during construction.	Fences, gates, and livestock/tortoise guards will be replaced or repaired to their original (pre-construction) condition, as required by the landowner or land management agency, if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or land management agency. Open boreholes would be fenced and covered. Access to water and feed would be maintained.

A segment of Ivanpah-Mead #2 Transmission Line crosses BLM Grazing Allotment lands that are east of I-15. Potential impacts associated with construction include the accidental release of livestock due to incidental damage to fencing or failure to close appropriate gates, injury to livestock due to open boreholes and trenches, and exclusion of livestock from water sources. Indirect impacts could result from the introduction of noxious weeds by construction vehicles.

Proposed Goodsprings Plant Site

The Goodsprings Plant Site is not located within BLM managed rangeland; therefore, there would be no impacts to BLM managed rangeland resulting from construction or operation of the plant or ancillary facilities.

Access Roads

The northern access road alternative and the southern access road alternative are not located within BLM managed rangeland. Therefore, there would be no impacts to BLM managed rangeland associated with the improvements to or use of either access road.

Water Treatment Plant

The proposed water treatment plant (regardless of option selected) is not located within BLM managed rangeland. Therefore, there would be no impacts to BLM managed rangeland.

Water Supply Pipeline

A portion of the water supply pipeline would be installed along the western boundary of the UPRR. Construction along

the west side of the ROW would not affect rangelands.

Transmission Lines

A portion of the two transmission line alternatives east of I-15 pass through BLM managed rangeland. Approximately 55,400 linear feet of the alternatives cross BLM Grazing Allotment Pastures 2 and 3, between the UPRR and the western base of the McCullough Range. Potential short-term impacts to livestock would be associated with activities related to construction of the transmission line; however, the extent of such impacts is expected to be negligible.

During construction, access to water and sources would be maintained and open structure borings would be adequately barricaded and covered to preclude injury to livestock. Rangeland improvements, such as fences, gates, and water sources that are damaged during construction of the transmission line would be immediately repaired. Temporary fences and other appropriate measures approved by the BLM in advance of their implementation would be used to control cattle movement; however, livestock would not be fenced, or otherwise impaired from adequate access to water and feed sources. Detailed actions that would be taken to avoid impacts to grazing or to mitigate those impacts that cannot be avoided will be addressed in the COM Plan.

Rangeland is not present in the vicinity of the Ivanpah Energy Center. Therefore, there are no potential impacts associated plant access Options 1, 2, 3, or 4.

5.1.8 Recreation

Summary of Impacts Related to Recreation	
Significance Criteria: Actions that would preclude or greatly curtail recreational activities. Actions that would jeopardize the health and/or safety of individuals that are engaged in recreational activities.	
Summary of Impacts	**Mitigation Measures**
Plant Site: No impacts – recreation activities not present.	None required.
Access Roads: No impacts – recreation activities not present.	None required.
Water Treatment Plant: No impacts - recreation activities not present.	None required.
Water Supply Line: No impacts – recreation activities not present.	None required.
Transmission Lines: Potential impacts to organized off-road racing, hunting, and recreation activities in Eldorado Valley would be moderate.	Coordinate construction of the transmission line with scheduled recreational activities in BLM-designated Special Recreation Areas. Schedule construction during months that will not conflict with the Bighorn Sheep hunting season. Coordinate construction of the transmission line in Eldorado Valley with scheduled activities through the City of Boulder City.

Construction of the Ivanpah-Mead #2 Transmission Line could result in temporary impacts to off-road racing events and casual users within the Jean/Roach Dry Lakes Special Recreation Management Area and elsewhere. Although the extent of impacts could include displacement of activities during construction, their severity could be reduced through appropriate scheduling, flagging of construction work sites, and restoration of disturbed areas. Transmission line construction through the McCullough Range also could temporarily displace bighorn sheep and reduce hunting success, if construction were to take place coincidental to the hunting season. Additional temporary impacts to birding and wildlife observation and study would result from increased dust, noise, and human activity during construction; the presence of the Proposed Ivanpah Energy Center at Goodsprings would result in a permanent loss of recreational opportunity at the plant site. Potential benefits that are often attributed to the creation of new roads and increased public access would be minimal because existing roads would be used to the maximum extent possible and new road construction that is typically associated with new transmission lines would be generally unneeded.

Proposed Goodsprings Plant Site

The Goodsprings Plant Site area is located within BLM's Jean/Roach Dry Lakes Special Recreation Management Area; however, this area is not used for recreation, except for occasional off-road

touring. Organized recreational activities, such as off-road racing events, primarily occur east of I-15. Therefore, potential short-term or long-term impacts to recreation that would be related to plant construction or operation are not anticipated.

Access Roads

Although existing county roads and trails south of the Ivanpah Energy Center are occasionally used by four-wheel drive vehicles, the use of County Roads 28 and 53Y by construction equipment would have a negligible impact to recreation in the area. The 14,000-foot-long trail that would be bladed would be accessible to the public. Access to county roads and public lands south of the plant site would be maintained by construction of a 2,000-foot-long bypass road.

Water Treatment Plant

The proposed water treatment plant (regardless of option selected) is not located within areas that are used for recreation. Therefore, there would be no impacts to recreation resources in the area.

Water Supply Pipeline

The water supply line route would parallel the UPRR and would be within the proposed Ivanpah-Mead Transmission Line corridor from a point east of I-15 to the plant site. The Jean Sport Aviation Center is located to the west of the SNCC water treatment plant; however, potential impacts resulting from construction of the water supply line to sport aviation activities are not anticipated. Although the pipeline would be located within BLM's Jean/Roach Dry Lakes Special Recreation Management Area, organized recreational activities, such as off-road competitive events, do not occur within the area. Race courses for off-road competitive events are restricted to existing and designated trails that are primarily east of the UPRR; therefore, potential impacts to off-road competitive events during construction are not expected.

The remaining portion of the water supply line route crosses I-15 to the west within a BLM-designated utility corridor. Organized recreational activities would not be impacted as a result of construction or the presence of the underground pipeline within the BLM utility corridor. Plant site access would not affect recreational activities, regardless of option selected.

Transmission Lines

Potential impacts to recreation resources that would be associated with construction and operation of transmission line Alternatives C and E would be similar. Both transmission line alternatives cross the Ivanpah Valley within the same BLM-designated utility corridor, where organized recreational activities, such as off-road competitive racing events, occur in the Jean/Roach Dry Lakes Special Recreation Management Area. Competitive off-road racing is carried out routinely by such organizations as SCORE International, Motorcycle Racing Association of Nevada (MRAN), and Best in the Desert Racing Association (BITD). Participants, including drivers, pit crewmembers, friends, and families range from as few as 150 to as many as 1,500. Some events draw as many as 2,000 spectators.

A review of permit records from the BLM indicates that many race courses cross under existing transmission lines that are within BLM-designated utility corridors,

including those that would be occupied by Alternatives C and E alignments in the Roach Lake/Jean Lake area. Known races that cross the alternative transmission line routes include "Primm 300," "MRAN Night Race," and the "Nevada 200." Impacts related to the presence of the alternative transmission line routes are not anticipated, primarily because the alignment used by both alternatives parallels existing transmission lines and because structures would, to the extent practicable, be located adjacent to existing structures. Potential adverse impacts to racing events can be mitigated by scheduling construction within the Jean Lake/Roach Lake area during times that will not conflict with race events.

Although the Jean Lake/Roach Lake area is used for airborne activities such as hang gliding, parasailing, and sky diving, such activities avoid existing transmission lines to the extent possible. The alternative transmission line route west of the McCullough Range would parallel existing transmission lines to the extent practicable; therefore, potential impacts to airborne recreation are not anticipated.

Potential impacts to BLM-managed Special Recreation Management Areas are not anticipated. Although construction of the transmission line would require coordination with scheduled activities, use of the area would not be curtailed.

Transmission line Alternatives C and E pass through McCullough Pass and are adjacent to BLM-designated Southern Nevada Extensive Recreation Management Areas (ERMAs) on the north side and to the south. By definition, recreational use in ERMAs is dispersed with few visitors. No impacts to BLM-designated ERMAs are expected from the construction or presence of transmission line Alternatives C and E. Potential impacts to big game hunting of the Desert Bighorn Sheep could occur where the transmission line alternative crosses the McCullough Range. Impacts associated with the Desert Bighorn Sheep hunting season can be mitigated by scheduling construction during months that will not conflict with the November-December hunting season.

While both transmission line alternatives cross the Eldorado Valley in an area that is not managed by BLM, recreational use (particularly casual and organized off-road events) occur in the dry lakebed west of U.S. 95. The City of Boulder City has designated some lands in the Eldorado Valley for recreational purposes. Approximately 6,860 and 20,400 linear feet of Alternatives C and E (respectively) would cross lands that have been designated by the city for recreational purposes. Long-term (life of the project) impacts to recreational activities in Eldorado Valley are expected to be negligible because both transmission line alternatives parallel existing transmission lines. Short-term impacts associated with construction could be mitigated by coordinating construction activities with scheduled organized events through the City of Boulder City.

Construction and operation of any of the four plant site transmission line access options would not affect recreation activities.

5.1.9 Transportation

Summary of Transportation Impacts	
Significance Criteria: A decrease of roadway or intersection traffic below level of service C. Adverse effects on public safety that would be likely to result in hazardous conditions, as defined by good engineering practices. Creation of permanent impediments to traffic.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Negligible-to-moderate impacts to traffic along SR 161 during the 22-month construction period. Negligible impacts to traffic during plant operations.	Limit vehicle movement by bussing workers to plant site. Use of southern temporary access roads during construction. Use of pilot cars, when warranted. Construction of a turning lane to the main entrance to the plant site would further benefit drivers along SR 161.
Access Roads: Not applicable.	None required.
Water Treatment Plant: Construction of the water treatment plant would require movement of heavy equipment on I-15 and local roads that also serve area businesses and the SNCC. However, impacts to transportation would be short-term and negligible.	Potential impacts to transportation could be minimized by scheduling of major plant components to periods when traffic related to area businesses is low. Pilot cars should be used, when appropriate.
Water Supply Pipeline: Not applicable.	None required.
Transmission Lines: Not applicable	None required.

Construction activities associated with the Proposed project would result in increased traffic. The movement of equipment and workers could result in temporary traffic safety issues and decreased levels of service at major intersections. The extent of such impacts, which would be largely related to plant construction, can be mitigated by the use of a temporary access road, scheduling of heavy loads, and the use of pilot cars. Therefore, impacts to transportation would not be significant.

Proposed Goodsprings Plant Site

Potential impacts to traffic along SR 161 and other roadways during construction at the Goodsprings Plant Site are expected to be moderate because increased traffic numbers can be quantified. Measures that would be used to alleviate traffic impacts would include: construction of a secondary road from SR 161 (to be used for the movement of heavy loads), the use of pilot cars (when appropriate), construction of a turning lane off SR 161 at the north entrance to the plant, bussing of construction workers to the work site, and scheduling of heavy equipment to avoid periods of relatively high traffic use. Traffic flow levels at area intersections are not expected to decrease from their current "A" levels during plant construction or plant operations (see Table 5-7).

Table 5-7 Anticipated Construction Vehicle Levels

Vehicle Type	Average Daily Trips	Peak Daily Trips
Construction Personnel	15	30
Worker Busses	6	10
Delivery Trucks	5	10
Heavy Vehicles and Trucks	5	15
Total	31	65

Access Roads

Primary access to the Ivanpah Energy Center Goodsprings plant site would be from SR 161 and County Road 53Y (North Access Road). Secondary access would be provided during construction via SR 161, County Road 28, an existing trail, and County Road 53Y (South Access Road). The northern access road would be improved and paved to remove severe horizontal and vertical curves and to facilitate the movement of heavy equipment. The southern access road also would be improved (but not paved), where necessary, to permit the movement of heavy equipment during construction.

Incremental impacts to traffic congestion that would be associated with plant construction or operation are not expected to reduce the current Level of Service from "A" at either the I-15/SR 161 interchange or the intersection of SR 161 and Sandy Valley Road.

Transportation requirements for construction of the generating facility would extend over a 22-month period. The average number of trips during the period are expected to total approximately 30; during peak periods (12th through 17th months of plant construction), daily trips would total approximately 65.

Assuming that approximately 100 to 150 vehicles use SR 161 during peak hours (8:00 to 9:00 a.m. and 5:00 to 6:00 p.m.), additional vehicles associated with plant construction would result in a negligible-to-moderate impact to overall traffic flow in the area.

Residents of Goodsprings and Sandy Valley have expressed concerns about traffic safety along SR 161 and a review of vehicular accident data from 1998 through 2000 indicates that two fatalities occurred during the period. (Nevada Department of Transportation, 2002). A traffic safety study, conducted along SR 161 indicates that the roadway is suitable for use at the posted speed. However, in response to public concerns regarding public safety, vehicular movement along the highway would be limited by bussing workers to the plant site from a central location near the intersection of I-15 and SR 161 during the 22-month construction period and a left turn lane would be installed on SR 161 at the main entrance to the plant site. Additional safety measures would be implemented by the use of the

Traffic safety during construction of the plant and poor road conditions (e.g. poor line of site, steep grades and dips on SR 161).

SR 161 is the only paved access to Goodsprings and Sandy Valley. Concern that traffic studies would only account for "peak" traffic periods.

southern access road for the movement of major equipment components. When necessary, pilot cars will accompany heavy equipment movement along highways and roads leading to the plant site. Although SR 161 is used by Goodsprings and Sandy Valley residents working numerous shifts, additional mitigation measures that may be taken include scheduling of heavy equipment movement to take place during periods when traffic flows are relatively light and scheduling to avoid weekends when recreational traffic is high. Impacts to highway safety that would be associated with the proposed action are expected to be moderate during construction and negligible during plant operations.

Highway safety if construction takes place during the weekend when recreation traffic is heavy.

Water Treatment Plant

Potential impacts to traffic along I-15 and local roads would be associated with plant construction. The extent of such impacts would be short-term and limited to the period of construction. The movement of heavy equipment could result in short-term traffic congestion at the I-15/SR 161 interchange, along South Las Vegas Boulevard, and along the road leading to the SNCC (Prison Road). The severity of impacts could be reduced by scheduling the movement of heavy loads to periods of relatively low traffic volume in the area and by the use of pilot cars, when appropriate. Actual impacts to traffic and highway safety are expected to be short-term and negligible during construction and negligible during plant operations.

Water Supply Pipeline

Potential impacts to highway, railroad, and aviation transportation resources that would be associated with construction of the water supply pipeline are not expected. The water supply pipeline would be installed under I-15 by boring under the highway, which would not affect traffic along the highway.

Transmission Lines

Transmission line crossings (I-15, U.S. 95, and secondary roads) would be accomplished using guard poles to support conductors during line stringing. The transmission line route north of the proposed Ivanpah Airport would parallel the Reliant Bighorn-Arden Transmission Line, which has been oriented in a manner to avoid potential conflicts with either the Jean Airport or the proposed Ivanpah Airport. Structure and conductor heights would be below FAA 1:100 aircraft slope clearance requirements for Jean Airport or for the proposed Ivanpah Airport. Therefore, impacts associated with the proposed transmission line are expected to be negligible. Access to the plant site would not affect transportation within the Ivanpah Valley, regardless of which option is selected.

5.1.10 Hazardous Materials

Summary of Impacts Related to Hazardous Materials	
Significance Criteria: Actions that would result in health and safety impacts to area residents. Violation of federal, state, or local regulations regarding handling, transport, or containment of hazardous materials as defined under CERCLA or SARA.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Potential impacts during construction or operation are not anticipated.	Use of aqueous ammonia, rather than anhydrous ammonia. Compliance with federal, state, and Clark County containment and spill prevention requirements.
Access Roads: Potential impacts during construction or operation are not anticipated.	Servicing of vehicles and equipment on public lands would be minimized, to the extent practicable.
Water Treatment Plant: Potential impacts during construction or operation are not anticipated.	Compliance with federal, state, and Clark County containment and spill prevention requirements. Servicing of vehicles and equipment on public lands would be minimized, to the extent practicable.
Water Supply Pipeline: Potential impacts during construction or operation are not anticipated.	Servicing of vehicles and equipment on public lands would be minimized, to the extent practicable.
Transmission Lines: Potential impacts during construction or operation are not anticipated.	Servicing of vehicles and equipment on public lands would be minimized, to the extent practicable.

Potential impacts related to hazardous materials include accidental releases of fuels, lubricants, and coolants due to vehicle/heavy equipment accidents and during maintenance/refueling activities. Potential harmful effects of hazardous materials associated with plant operations have been reduced by a decision by the project proponent to use aqueous ammonia, rather than anhydrous ammonia, for air emissions reduction. Spill prevention, containment, and cleanup would be in accordance with requirements of OSHA, CERCLA, SARA, and EPA guidelines, thus, potential impacts associated with hazardous materials would not be significant.

Proposed Goodsprings Plant Site

Non-hazardous and hazardous wastes would be generated as part of construction and operation of the proposed IEC generating facility, access roads, telecommunications line, natural gas supply line, water line, and transmission lines. All wastes generated from such activities would be transported off-site for disposal at approved disposal sites or transported for recycling through approved vendors and suppliers. Burning of trash would not be permitted. Therefore, impacts associated with the generation, storage, or removal of such wastes are not anticipated.

Waste disposal and transport from the plant site.

Ammonia will not be used as a refrigerant. Aqueous ammonia (at concentrations of

less than 20 percent) would be used for air emissions reduction; anhydrous ammonia would not be stored within, or used at the facility. Therefore, potential impacts associated with the transport, use, or storage of ammonia are not anticipated.

Hazards of ammonia storage and ammonia use for refrigerant as well as monitoring for leaks.

Construction and operation of the IEC generating facility and related facilities will require the use and removal of hazardous and non-hazardous wastes. Hazardous materials are defined as any substance, pollutant or contaminant that is listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 USC 9601 et seq., and its regulations (CERCLA). The definition of hazardous substances under CERCLA includes any "hazardous waste" as defined in the Resource Conservation and recovery Act of 1976 (RCRA), as amended, 42 USC 6901 et seq., and its regulations. Hazardous materials also includes any nuclear byproduct material as defined by the Atomic Energy Act of 1954, as amended, 42 USC 2011 et seq. Should any hazardous material be declared a hazardous waste, it will be handled, stored, transported and disposed on in a manner that is consistent with EPA and State of Nevada Regulations 40 CFR 267-270 and NAC 444.850-444.8746, respectively. Asbestos and antifreeze will be handled consistent with NAC 444.965-976 and NAC 444.8801-9071, respectively. The release of any hazardous material or waste will be immediately reported to the National Response Center consistent with the National Contingency Plan. (40 CFR 300). The BLM will be concurrently notified. No impacts to soils or groundwater will occur as a result of the proposed project.

Non-hazardous waste materials, solid hazardous materials, and liquid hazardous materials that would be generated during construction of the IEC generating facility are summarized in Table 5-8.

Table 5-8 Non-hazardous Waste and Hazardous Waste Associated with Plant Construction

Non-hazardous Waste			
Type	**Description**	**Disposal**	**Quantity**
Paper, Wood, Glass, Plastics	Paper, wood, glass, and plastics will be generated from packing materials, waste lumber (forming materials and pallets), insulation, and empty non-hazardous containers.	Wastes will be recycled where practical. Waste that cannot be recycled will be disposed of in a Class III landfill.	150 tons
Concrete	Excess concrete will be generated through truck waste.	Waste concrete will be used for non-structural purposes (sidewalks, curbs, gutters). Any un-recycled concrete will be disposed in an approved construction waste landfill	50 tons
Metals	Metal scrap material will be generated from construction activities.	All scrap metal will be recycled to the extent practicable; non-recyclable waste will be disposed in a Class III landfill.	50 tons
Solid Hazardous Waste			
Batteries		Spent batteries will be shipped offsite to a permitted battery recycling facility	75 lbs.
Mercury		All mercury-containing items such as switches and mercury-vapor lights will be shipped offsite to a permitted recycling facility or to a permitted disposal facility.	2 lbs.
Liquid Hazardous Waste			
Cleaning Fluids, Solvents, Paint, Antifreeze, Pesticides, Lubricants, Fuels	Wastes will be recycled, to the extent practicable. Antifreeze and hydrocarbon wastes will be shipped offsite to a permitted recycling facility.	Phosphate/Nitrate Solutions	500 lbs.
		Cleaning Solvents	300 gals
		Paint Waste	50 lbs.
		Antifreeze	100 lbs.
		Pesticides	100 lbs.
		Lubricants	10 gals.
		Diesel Fuel	100 gals.

The IEC generating facility (classified as a small generator of hazardous materials) will operate under a set of Procedures and Programs, which deal with fires and other emergencies. The Procedures and Programs will address/include: fire safety, fire response program, emergency response procedures, and related actions. Estimated response time to the plant site according to Clark County Fire Department is 30 minutes.

Safety measures at the plant site in the event of a fire or hazardous spill emergency.

Length of emergency response time for Clark County Fire Department to respond to a fire or hazardous material spill.

Waste lubricating materials will be periodically generated during the operation and maintenance of the generating units. These materials will be collected and stored in appropriately designed and labeled storage containers. Waste lubricants will be recycled by an approved contractor in compliance with applicable regulations. Similar treatment will be afforded the sludge collected at the oil-water separator.

Herbicides, pesticides, and algaecides will be stored inside a suitable structure. The immediate area around these chemicals will be appropriately labeled. The storage of such chemicals onsite will be minimized. In the event that an amount of any of these chemicals must be disposed of, such disposal will be conducted in compliance with all local, state and federal disposal and handling regulations.

Unused batteries will be stored in an appropriate location, inside a storage structure on the property. Used batteries will be stored, prior to disposal, in an appropriately labeled and protected location. Spent batteries will be sent to, and recycled by, an approved recycling facility.

Combustion exhaust catalyst will be used as part of the air quality control systems associated with the generating units. These catalyst materials, which will consist of vanadium and other metals, are expected to last approximately 5 years. Spent catalyst will be recycled by the manufacturer.

Solvents may be used for parts cleaning and other maintenance activities. The use of solvents onsite will be minimized. All solvents will be stored in labeled areas in appropriate containers. Spent solvents will be collected and recycled by an appropriately licensed contractor.

Media-blasting (sand-blasting) will be used for cleaning and descaling of various parts and components from time-to-time. The spent blasting media may be a hazardous waste, and will be treated as such. The spent media will be collected and recycled by a licensed contractor.

Anti-freeze will be used and replaced in certain machinery such as the diesel fire pump engine. Waste anti-freeze will be disposed of at a licensed recycler.

Although not a waste, ammonia will be used in the selective catalytic reduction process to reduce nitrogen oxides compounds from the exhaust of the fuel combustion in the generating units. It is planned that aqueous ammonia at less than 20 percent concentration will be stored in five 20,000-gallon tanks onsite prior to use. These tanks will be designed with secondary containment, and will be structurally protected to prevent accidental releases. No waste ammonia is expected to

be generated during the operation of these generating units.

Accidental spills will be handled in accordance with applicable laws and plant operations procedures consistent with regulatory requirements.

Table 5-9 lists annual volumes of non-hazardous and hazardous wastes that will be generated during operation of the generating facility.

Table 5-9 Non-Hazardous Waste and Hazardous Waste Associated with Plant Operations (Annual Volumes)

Non-Hazardous Waste			
Type	**Disposal**		**Quantity**
Water Treatment Solid Waste, Paper and Miscellaneous Trash	Wastes will be recycled where practical. Waste that cannot be recycled will be disposed in a Class III landfill.		1,000 pounds (minimum)
Hazardous Waste			
Combustion Exhaust Catalyst, Solvents, Paint, Oil/water Separator Sludge, Sand Blast Media, Antifreeze	Wastes will be recycled, to the extent practicable. Antifreeze and hydrocarbon wastes will be shipped offsite to a permitted recycling facility.	Batteries	180 pounds
		Combustion Exhaust Catalyst	25 tons
		Solvents	500 gallons
		Paints	200 gallons
		Oil / Water Separator Sludge	60 tons
		Sand Blast Media	4,000 pounds
		Antifreeze	500 gallons

Construction of the natural gas supply line or the telecommunications line would not require large quantities of hazardous or non-hazardous materials. Therefore, no impacts are expected to be associated with such actions.

Access Roads

Construction of the north or south access roads are not expected to generate large quantities of non-hazardous or hazardous materials. Servicing of heavy equipment would be carried out off-site to the extent practicable and large quantities of fuels and lubricants would be stored on private land.

Water Treatment Plant

Non-hazardous and hazardous wastes would be generated as part of construction and operation of the proposed water treatment plant. All wastes generated from such activities would be transported off-site for disposal at approved disposal sites or transported for recycling through approved vendors and suppliers. Burning of trash would not be permitted; therefore, impacts associated with the generation, storage, or removal of such wastes are not

anticipated. Construction and operation of the facility would be subject to federal, state, and county regulations as stated for the Ivanpah Energy Center.

Although specifications have not been prepared for the plant, it is likely that solid and liquid non-hazardous and hazardous wastes that would be generated during construction and operation would be similar (but in much less quantities) to those that would be generated during construction and operation of the Ivanpah Energy Center. Requirements for handling and storage of such materials would be similar to those related to construction and operation of the Energy Center. Consequently, impacts related to the facility are not anticipated.

Water Supply Pipeline

Construction of the water supply pipeline is not expected to generate large quantities of non-hazardous or hazardous materials. Servicing of heavy equipment would be carried out off-site to the extent practicable and large quantities of fuels and lubricants would be stored on private land.

Transmission Lines

Transmission line construction is not expected to generate large quantities of non-hazardous or hazardous materials. Servicing of heavy equipment would be carried out off-site to the extent practicable and large quantities of fuels and lubricants would be stored on private land. Transmission line inspections and maintenance would be carried out as necessary and at intervals that would be in compliance with industry-accepted frequencies.

5.1.11 Visual Resources

Summary of Visual Impacts and Mitigation	
Significance Criteria: Conflict with VRM objectives as stated in the Resource Management Plan Substantial visual impacts at sensitive receptors of a large number of area residents.	
Summary of Impacts	**Mitigation Measures**
Plant Site: KOP #1a: Weak contrast, negligible impact KOP #1b: weak contrast, negligible impact KOP #2: weak contrast, negligible impact	KOP #1a and #1b: • Use of medium gray-painted structures to reduce visual contrast* Use of nonspecular conductor to reduce visual impact. KOP #2: • Use of colors on plant components that blend with the surrounding desert landscape. • Use of directional lighting and shielding devices to reduce glare; limited lighting use and placement of lighting only in areas where needed or required by regulation. • Contouring of disturbed surface areas following construction of the plant facility to closely match the surrounding area.
Access Road: Northern Access Road – Negligible Southern Access Road - Negligible	Revegetation of temporarily disturbed areas with native plant species according to the BLM-approved Restoration Plan along the ROW.
Water Treatment Plant: Negligible visual impact to viewers from area businesses.	Use of colors on plant components that blend with the surrounding desert landscape. Use of directional lighting and shielding devices to reduce glare; limited lighting and placement of lighting.
Water Supply Pipeline: - Negligible **Water Supply Pipeline Plant Access Options:** Option 1 – Moderate Option 2 – Negligible Option 3 – Negligible Option 4 - Negligible	Revegetation of temporarily disturbed areas with native plant species according to the BLM-approved Restoration Plan along the ROW.
Transmission Lines: KOP #3 Substation *(not a component of this project)*: strong contrast, significant impact KOP #3 Transmission line: weak contrast, negligible impact KOP #4 Substation *(not a component of this project)*: strong contrast, significant impact KOP #4: Transmission line: weak contrast, negligible impact KOP #5a: weak contrast, negligible impact KOP #5b: weak contrast, negligible impact KOP #6: weak contrast, negligible impact KOP #7: weak contrast, negligible impact	KOP #3 and #4: • Pole-for-pole configuration with existing structures • Use of medium gray-painted structures* • Use of nonspecular conductor • Use of materials and colors that blend with the surrounding landscape for substation fencing KOP #5a, #5b, #6, and #7: • Use pole-for-pole configuration to the extent practical • Use nonspecular conductor • Use medium gray-painted structures*
*Specifications for Gray-painted structures Company: Carboline Color #: 0729 (Medium Gray) Paint #: 8819 Top Coat #: 8809 (Acrylic Aliphatic Polyurethane)	

Construction and operation of the proposed project will result in impacts to several view sheds. The severity of such impacts is largely dependent upon viewer sensitivity, viewer duration, the presence or absence of other features in the area, and the size, shape, and form of the object(s) being viewed. Although new transmission lines and other project components will result in visual impacts, mitigation measures would be taken that would reduce their severity to insignificant.

BLM VRM Classifications

As discussed in Section 4.11.2, according to BLM's *Las Vegas RMP*, the proposed project and alternatives would be located within two VRM Classes, Class II and Class III. The area of the Proposed Goodsprings Plant Site and the Proposed Table Mountain Substation is located within a VRM Class II Area (See Figure 4-8). Portions of the proposed transmission line associated with the Goodsprings plant site that cross the Ivanpah Valley are within a VRM Class III; portions of the transmission line that cross the McCullough Range and Crystal Pass are located within a VRM Class II area (See Figure 4-8).

VRM Evaluation Process

The measure of potential adverse impact on visual resources is based on visual contrast. Visual contrast is a measure of the degree of perceived change that would occur in the landscape due to construction and operation of facilities associated with the proposed project. Visual contrast would typically result from landform modifications that are necessary to upgrade roads and pad sites associated with the transmission line and plant site facilities; removal of vegetation to construct the facilities and roads, and to maintain the required rights-of-way; and the introduction of new structures in the landscape.

A visual contrast rating evaluation was conducted to determine the degree of contrast the proposed project would have on the affected landscapes. The visual contrast evaluation process for this project follows the guidelines described in the BLM's Visual Resource Contrast Rating, BLM Manual Handbook 8431-1.

The first step in the visual contrast rating evaluation is to identify key observation points (KOPs). KOPs are determined based on critical viewpoints, typically along well-traveled routes, near sensitive receptors such as homes and communities, highway crossings, and by type and number of viewers. Seven key observation points (KOPs) were identified for the Goodsprings Plant Site project and are described in Table 5-10. The location of each KOP is shown in Figure 5-4. Visual simulations are shown in Figures 5-5 through 5-16 and a comparison of transmission line structure colors is shown on Figure 5-17. Figures 5-4 through 5-17 are provided at the end of Section 5.

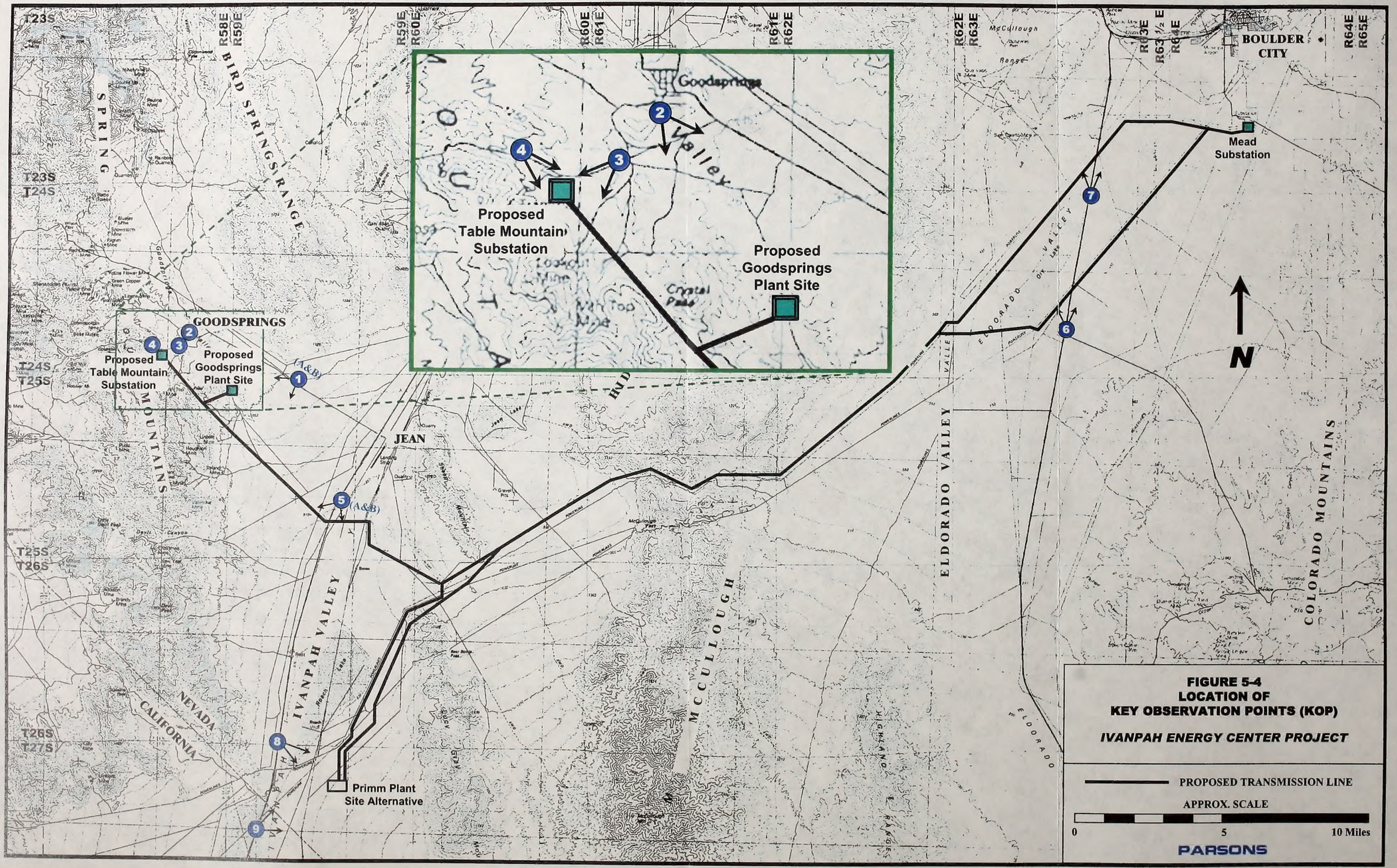


FIGURE 5-4
LOCATION OF
KEY OBSERVATION POINTS (KOP)

IVANPAH ENERGY CENTER PROJECT

PROPOSED TRANSMISSION LINE

APPROX. SCALE

0 5 10 Miles

PARSONS



Table 5-10 Description of KOPs Associated with the Proposed Goodsprings Plant Site

KOP	KOP Description
KOP #1	View from SR 161 where the Goodsprings Plant Site would be most visible, approximately 2 to 3 miles west of Jean. Two simulations were prepared for this KOP to compare the potential impacts associated with the two different transmission line structure colors (Coreten and gray-painted). KOP #1 was selected because of viewer sensitivity along SR 161, and based on preliminary data; potential visual impacts associated with the plant and transmission lines are most likely from this viewpoint.
KOP #2	View from Goodsprings residents near the SR 161/Sandy Valley Road intersection. KOP #2 was selected because of the potential for visual impacts to existing residents.
KOP #3	View westbound on Sandy Valley Road at the Table Mountain Substation where the transmission lines would interconnect. KOP #3 was selected because of potential visual impacts associated with the substation and transmission lines to sensitive viewers and the duration of the view.
KOP #4	View eastbound on Sandy Valley Road at the Table Mountain Substation where the transmission lines would interconnect. KOP #4 was selected because of potential visual impacts associated with the substation and transmission lines to sensitive viewers.
KOP #5	View southbound on I-15 where the transmission line would cross the interstate. Two simulations were prepared for this KOP to compare the potential impacts associated with the two different structure colors (Coreten and gray-painted). KOP #5 was selected because the transmission line crosses the highway and the potential for visual impacts to a large number of viewers.
KOP #6	View northbound on U.S. 95 where the transmission line alternative would cross the highway just south of the dry lakebed. KOP #6 was selected because the transmission line crosses the highway and the potential for visual impacts to a large number of viewers.
KOP #7	View northbound on U.S. 95 where the transmission line alternative would cross the highway just north of the dry lakebed. KOP #7 was selected because the transmission line crosses the highway and the potential for visual impacts to a large number of viewers.

Visual Resource Contrast Rating Worksheets were completed for each of the seven KOPs to assess the degree of contrast between the existing landscape and the landscape modified by the proposed project (See Appendix I). The analysis included a comparison of three basic features (landform/water, vegetation, and structures) and the basic elements (form, line, color, and texture) of the existing landscape and the modified landscape. The degree of contrast is determined by rating the elements of the existing landscape with the modified landscape according to criteria described in Table 5-11 below.

Table 5-11 Criteria for the Degrees of Contrast

Degree of Contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

BLM Manual Handbook 8431-1

Computer generated visual simulations depicting the proposed project on affected view sheds were prepared for each of the seven KOPs in the contrast evaluation. Simulations visually portray the proposed project and are a useful tool in determining the degree of contrast as part of the visual impact analysis. High resolution photographs using a standard digital camera were taken of the proposed project site from KOPs 1, 2, 5, and 7 on April 16, 2002 between the hours of 11:00 a.m. and 2:00 p.m. Key observation points 3 and 4 were taken on May 16, 2002 between the hours of 11:00 a.m. and noon; KOP #6 on May 21, 2002 during the same hours. The photographs, along with conceptual plans, design drawings, and sections or profiles of the project facilities were scanned at a high resolution. To scale and position the design features of the project, a three-dimensional wire topographic model of the project area was prepared. A digital terrain model was applied and earthwork cross sections were run to determine limits of cut and fill slopes. Foreground and background features were spatially identified, colors and textures determined, and shadows and reflections were generated based on time of day and sun angles.

Contrast ratings were compared with the objectives outlined for the Visual Resource Management (VRM) class designated by the BLM RMP for the project area. The area where the proposed transmission line crosses the Eldorado Valley is located on private land (KOP #6 and KOP #7), and therefore, is not subject to BLM VRM guidelines. However, to be consistent, VRM guidelines were applied to all lands within the project area. If required, mitigation measures were then identified to

reduce the level of potential visual impact to affected landscapes in order to meet the management objectives of the BLM VRM class.

Following is a discussion of the visual impacts associated with each project component and the KOPs that were evaluated and potential visual impacts not associated with a KOP. Visual contrast evaluations are located in Appendix I; visual simulations are located at the end of this section.

Proposed Goodsprings Plant Site

Impacts Associated with KOP #1a

Two contrast evaluations were conducted for KOP #1 where plant site Alternative E would be most visible from SR 161. Key observation point #1a evaluated the view of the plant site using Coreten (self-weathering steel) structures; KOP #1b evaluated the same view using gray-painted structures. A simulation, Figure 5-7, was prepared from KOP #1 using a terrain grid to illustrate the location of the plant facility behind the intervening hill.

The contrast evaluation (Appendix I) indicates that visual contrast associated with the view of the plant site from SR 161 (KOP#1a, Figure 5-5) would be "weak," resulting in a negligible impact. The landscape has been previously modified with the presence of the Kern River Gas Transmission Compressor Station and an existing transmission line that crosses the view shed horizontally. These visual features are approximately 3 – 3.5 miles from SR 161 and barely noticeable to motorists. The appropriate application of color to these facilities and distance contribute to their lack of prominence in the view shed. The existing Reliant Bighorn-Arden Transmission Line uses medium gray-painted structures, which appear almost invisible against the mountain backdrop; the compressor station is painted with colors that blend with the surrounding desert landscape.

The introduction of the proposed plant facility and associated transmission lines would create a weak visual contrast to the landscape. Figure 5-7 illustrates a simulation of a terrain grid applied to the proposed power plant facility. The terrain grid outlines the contours of the topographic features in the project area. As shown, the intervening mountain screens the plant facility from views of KOP 1 on SR 161. The only visible components of the project from this KOP are the transmission lines crossing the mountain and a small upper portion of the switchyard.

Visibility of the plant from SH 161 – would plant color blend with landscape?

While the transmission lines appear small from this distance, the Coreten (self-weathering steel that turns a rusty brown) structures tend to be somewhat visible against the mountain backdrop. This slight contrast could be attributed to the time of day or direction of lighting. Objects appear brighter when light direction is from the front; backlit objects (illumination from behind) appear less bright and dull. While the direction of light may have a similar effect on other colors, use of low chroma (the degree of color saturation or brilliance) colors could reduce visibility. Colors that are dull, with grayish tones tend to fade, particularly with distance because of light scattering by dust particles. An example of lighting effects on different color structures and the structures' distance from the viewer is

Impacts to existing view sheds from transmission lines.

illustrated in Figure 5-15. Photograph A shows a backlit Coreten transmission line alongside a medium gray-painted line; Photograph B shows a frontlit Coreten structure alongside a medium gray-painted line. While the conditions of lighting direction (frontlit vs. backlit) show different levels of brightness for both color structures, the medium gray-painted (low chroma) structures appear less noticeable with distance.

Additionally, use of nonspecular conductor to reduce reflection and glare associated with "strings" of conductor over the mountain would minimize visual contrast.

Impacts Associated with KOP #1b

Key observation point #1b illustrates the use of gray-painted structures versus the Coreten structures of the same view. Based on the contrast evaluation (Appendix I), the visual contrast associated with the plant facility and transmission lines (gray-painted) (KOP #1b), Figure 5-6 would be "weak," resulting in a negligible impact. As with KOP 1a, the plant facility is not visible from this KOP and, at a distance of 3 to 3.5 miles, the transmission lines appear small; however, the gray-painted structures are slightly less noticeable. Again, this could be attributed to lighting of the structures or time of day; however, grayish ones (low chroma colors) tend to fade and become less visible with distance (see Figure 5-15).

Impacts Associated with KOP #2

Based on the contrast evaluation (Appendix I), the visual contrast associated with the resident's view of the plant facility to the south from Sandy Valley Road (KOP #2, see Figure 5-8), resulted in a "weak" rating for the elements of line, form, and texture; the element of color resulted in a "moderate" rating. By applying the appropriate mitigation to color as discussed below and described in the contrast rating worksheet (Appendix I), the overall contrast rating for this KOP would be "weak," resulting in a negligible impact. Key observation point #2 is a view shed approximately 2.25 miles from the proposed plant facility and represents a single residence's view of the proposed plant facility to the south at an elevation of approximately 3,600 ft. amsl (approximately 100-ft. higher than the plant's emissions stacks). Presence of the proposed plant facility would begin to alter the existing landscape, which is void of any manmade modifications or structures. The plant facility, primarily the plant's emissions stacks, would be noticeable, but would not dominate the resident's view shed. Visual impacts to casual motorists driving along Sandy Valley Road, which crosses the foreground from east to west, also would be negligible. The lower elevation of the roadway and the rise in topography south of the road are existing features that help to reduce visibility of the plant facility to motorists. Use of colors on plant components that blend with the surrounding landscape would minimize, but not completely eliminate any visual contrast.

Visibility of the plant from SR 161 – would plant color blend with landscape?

Viewers from KOP #2, however, would be particularly sensitive to visual impacts associated with lighting from the plant during nighttime hours. Use of directional lighting, which would shield some views from outside the plant, could reduce but not eliminate lighting impacts. Additionally, limiting the number and reducing the intensity of lights to only portions of the plant where and when they are needed would minimize the effects of nighttime

lighting. During cold weather periods, a condensation plume associated with plant operations could be visible. The size and height of the plume would depend on plant operation conditions and meteorological conditions present near the plant facility.

Potential Impacts Not Associated with a KOP

There would be brief visual impacts from I-15 as well as other points along SR 161 where the plant facility would be noticeable. Motorists traveling northbound on I-15 between Primm and Jean would experience some visual impacts for a certain distance. Upper portions of the plant would be visible, but the impact would be negligible primarily due to the approximate four to five-mile distance of the facility from the interstate. At this distance, the facility will appear small and color contrasts less noticeable. Additionally, motorists along I-15 would be traveling about 70 mph; their views would be brief and of short duration. Therefore, visual impacts associated with motorists along I-15 would be negligible.

Motorists traveling west on Sandy Valley Road near the intersection of SR 161 and Sandy Valley Road would encounter views of the facility's emissions stacks. However, less than 55 ft of the upper portion of the stacks would be visible. Likewise, the facility's stacks would be visible to motorists traveling Sandy Valley Road to the east towards the same intersection. Once motorists turn east towards Jean on SR 161, visibility of the stacks would increase slightly, but disappear after approximately 1 mile east of the intersection where mountains in the foreground shield the facility. Visual impacts associated with motorists at the intersection of Sandy Valley Road and SR 161 would be negligible because their views would be brief and of short-duration.

Depending on plant operations and meteorological conditions, a condensation plume could be noticeable to the casual observer from any location along I-15, SR 161, and Sandy Valley Road, particularly during cold weather months.

Access Roads

Visual impacts associated with the construction of the northern access road Alternative would primarily be related to construction and temporary surface disturbance. The northern access road would be paved and could create some visual contrast with the appearance of a dark band and contrasting edges, textures, and color. Motorists traveling along SR 161 would experience a brief visual impact resulting from the contrast associated with the paved northern access alternative.

The southern access road is an existing gravel road and trail. Temporary potential visual impacts could occur during construction with construction vehicle traffic and the resulting traffic-induced dust.

Water Treatment Plant

The water treatment plant (regardless of specific plant location) would be visible from traffic along Las Vegas Boulevard, the access road to the SNCC, and some area businesses. Impacts related to the plant would be ameliorated by its location within an area that presently includes the UPRR, several cellular telephone towers, scattered buildings, a water well, and the SNCC rapid infiltration basins. The sensitivity of viewers along local roads is likely to be low, because the plant site

(regardless of option selected) is along or near a road that is largely used for access to the SNCC and most views would be of short duration. Visual impacts would be reduced by the use of a color that would blend with the desert landscape, installation of shielded lighting to reduce glare, and limiting the use of lighting to locations where it is necessary to meet security and worker safety needs.

Water Supply Pipeline

Visual impacts associated with the construction of the water supply pipeline are expected to be limited to temporary surface disturbance along the ROW. Surface disturbance would include a 40-foot-wide corridor where vegetation would either be removed or disturbed as a result of pipe laying activities. The extent of visual impacts associated with removal of vegetation would be attenuated over time as the site restoration/revegetation, is implemented.

Water Supply Pipeline Plant Access Options

Visual impacts associated with construction of water supply pipeline plant access Option 1 would occur. Option 1 would parallel the three transmission lines (five circuits) crossing the mountain. During construction, temporary surface disturbance along the 40-ft-wide water supply line ROW would create visual contrast in an area that is currently undisturbed. This modification in the existing landscape would be noticeable to the casual observer traveling SR 161. While the visual impact would be temporary, the contrast would be visible for some time until the process of restoration and revegetation would become effective. Therefore, temporary visual impacts associated with Option 1 would be moderate.

Visual impacts associated with construction of water supply pipeline plant access Options 2 and 3 (across or around the toe of the mountain) would be similar to the water supply pipeline and limited to temporary surface disturbance along a 40-foot-wide ROW where vegetation would either be removed or disturbed as a result of pipe laying activities. Surface disturbance would not be noticeable to the casual observer, because the water supply pipeline ROWs near the plant would be approximately four to five miles from I-15.

Visual impacts associated with construction of the water supply pipeline plant access Option 4 would be the same as Option 2 and 3. Option 4 proposes to route one transmission line over the mountain to interconnect with the VEA transmission line, with two additional transmission lines along the base of the mountain south of the plant site. The water supply line would parallel one of two transmission line routes along the base of the mountain south of the plant site. As mentioned above in Options 2 and 3, temporary surface disturbance would not be noticeable to the casual observer because of the ROW's distance from I-15.

Transmission Lines

Impacts Associated with KOP #3

Key observation point #3 is a westbound view from Sandy Valley Road of the IEC transmission line interconnection to the proposed Table Mountain Substation. The proposed substation is not a component of the IEC project; therefore, results of the visual impacts analysis are reported separately for the transmission line and the substation.

Transmission Line Interconnection

Based on the contrast evaluation (See Appendix I), the visual contrast associated with the proposed transmission line interconnection to the substation (KOP #3, See Figure 5-9) would be "weak" resulting in a negligible impact. The proposed transmission lines would parallel an existing line in a pole-for-pole configuration, using medium gray-painted structures. The proposed gray-painted structures would create some visual contrast with the existing Coreten structures. Use of nonspecular conductor would minimize the reflection and glare associated with traditional conductor, and consequently, reduce the severity of visual impact.

Table Mountain Substation

The visual contrast associated with the proposed substation would be "strong" resulting in a significant impact (Figure 5-9). From KOP #3, motorists traveling west along Sandy Valley Road would encounter visual impacts resulting from the presence of the substation. The portion of Sandy Valley Road westbound towards the proposed substation location is undulating. Views from rises in the roadway would capture the modifications in the landscape for some distance. While the landscape has been previously modified with the presence of an existing Coreten, single pole transmission line, introduction of the substation would be unavoidable and would create greater visual contrast in the landscape. Fencing the substation facility with materials and colors that blend with the surrounding landscape, would minimize visual impacts associated with the substation.

Impacts Associated with KOP #4

Key observation point #4 is an eastbound view from Sandy Valley Road of the IEC transmission line interconnection to the proposed Table Mountain Substation. Visual impacts associated with KOP #4 would be similar to the impacts described for KOP #3. As mentioned above, the proposed substation is not a component of the IEC project; therefore, results of the visual impacts analysis are reported separately for the transmission line and the substation.

Transmission Line Interconnection

The contrast evaluation (See Appendix I) indicates that visual contrast associated with the proposed transmission line interconnection to the proposed substation would be "weak" resulting in a negligible impact. The proposed transmission lines would parallel an existing line in a pole-for-pole configuration, using medium gray-painted structures. Use of nonspecular conductor would minimize the reflection and glare associated with traditional conductor.

Table Mountain Substation

According to the contrast evaluation, visual contrast associated with the proposed substation would be "strong" resulting in a significant impact. Motorists traveling eastbound on Sandy Valley Road; however, would experience a slightly less visual impact than motorists traveling westbound because of a shorter view duration. The substation would become visible and unavoidable once motorists round a curve in the road, but would disappear shortly after the roadway turns more easterly and away from the view. Fencing the substation facility with materials and colors that blend with the

surrounding landscape would minimize visual impacts associated with KOP #4.

Impacts Associated with KOP #5a

Two contrast evaluations were conducted for KOP #5 where the proposed transmission line crosses I-15. KOP #5a evaluated the transmission line crossing using Coreten structures; KOP #5b evaluated the same crossing using gray-painted structures.

According to the contrast evaluation (Appendix I), the visual contrast associated with the transmission line crossing I-15 using Coreten structures (KOP#5a, Figure 5-11) would be "weak" resulting in a negligible impact. On the west side of I-15, the proposed Coreten transmission line would parallel on the north side, in a pole-for-pole configuration, an existing medium-gray-painted line. The existing gray-painted line parallels another existing Coreten line on the south side of the utility corridor. On the east side of I-15, the proposed Coreten transmission line would parallel on the north side, in a pole-for-pole configuration, the same existing medium gray-painted line. The existing Coreten line located on the west of I-15 does not parallel the existing gray-painted line on the east side of I-15. The proposed Coreten structures would create some visual contrast alongside the existing medium gray-painted structures; however, the visual contrast would be slightly greater on the east side of the I-15 crossing where the Coreten structures would parallel only the existing gray-painted line.

Impacts Associated with KOP #5b

Based on the contrast evaluation (Appendix I), the visual contrast associated with the transmission line crossing I-15 using medium gray-painted structures (KOP #5b, see Figure 5-12 would be "weak" resulting in a negligible impact. The proposed transmission line would be in a pole-for-pole configuration with the existing lines to reduce visual contrast. While the presence of the existing Coreten structures would create some contrast with the existing and proposed gray-painted structures, the visual impact would be negligible.

On the east side of the I-15 transmission line crossing, the proposed medium gray-painted transmission line would parallel the existing gray-painted line in a pole-for-pole configuration. The similarly painted structures and the pole-for-pole configuration reduce the visual contrast associated with an additional transmission line.

The introduction of a new transmission line to the existing landscape would not be noticeable to the casual observer, particularly the motorist traveling I-15 whose view would be brief and of short duration. Therefore, visual impacts associated with the transmission line crossing I-15, using medium gray-painted structures, would be negligible.

Impacts Associated with KOP #6

Based on the contrast evaluation (Appendix I), the visual contrast associated with transmission line Alternative E (KOP #6, Figure 5-13 where the transmission line crosses U.S. 95 south of the dry lakebed would be "weak." The proposed transmission line would parallel four existing lattice structures on the south side of the utility corridor. An existing single pole Coreten line is located on the north side of the corridor. The proposed transmission line would be in a pole-for-pole configuration, to the extent prac-

ticable, with the existing lines on the south side of the utility corridor. Spans for the existing lattice structures are longer, approximately 1,000 ft; whereas, the spans for the proposed single-pole structures are approximately 700 – 800 ft long. The spacing difference could create some visual contrast; however, the proposed medium gray-painted structures would blend with the steel lattice structures to reduce contrast. With the presence of five existing transmission lines, introduction of a new transmission line would not be noticeable to the casual observer, particularly the motorist traveling U.S. 95 whose view would be brief and of short duration. Therefore, visual impacts associated with transmission line Alternative E, would be negligible.

Impacts Associated with KOP #7

From KOP #7, the contrast evaluation (Appendix I) indicates there would be "weak" visual contrast associated with Alternative C (Figure 5-13 where the transmission line crosses U.S. 95 north of the dry lakebed. The proposed transmission line would parallel two existing lattice structures. Similar to Alternative E, the transmission line would be in a pole-for-pole configuration, to the extent possible, with the existing lines; however, the different span lengths associated with lattice and single pole structures could create some visual impact. The landscape from KOP #7 was been previously modified with a clutter of structures and existing transmission lines. The presence of a new transmission line would be noticeable, but not to the extent that the modification to the landscape would dominate the view shed or attract the attention of motorist traveling U.S. 95. Additionally, the proposed structures would be gray-painted to blend with the existing lattice structures to further reduce visual impacts. Therefore, visual impacts associated with transmission line Alternative C would be negligible.

Potential Impacts Not Associated with a KOP

The proposed transmission line would cross the McCullough Range in a VRM Class II area; however, it both transmission line alternatives would be located within a BLM-utility corridor and would parallel three existing transmission lines. Since the landscape has been previously modified with the presence of existing structures, visual impacts resulting from an additional transmission line would be negligible. Additionally, the proposed transmission line enters a portion of the project area that would be "seldom seen," where the likelihood exists that only the casual recreational user would be affected.

The portion of the transmission line that would pass through the McCullough Range also would pass between the boundaries of two BLM-designated Wilderness Study Areas (WSA), the North McCullough Mountains WSA to the north and the South McCullough Mountains WSA to the south. WSAs typically are classified with a VRM Class I; however, both WSAs in the vicinity of the proposed transmission lines are designated a VRM Class II. Since the transmission line would not be constructed within the Wilderness Study Areas, visual impacts are not expected to occur.

Transmission Line Plant Access Options

Transmission line plant access Option 1, where the three transmission lines (consisting of five circuits) would cross the mountain and interconnect with the VEA

transmission line, would create a "moderate" visual contrast to motorists traveling along SR 161 (see Figures 5-5 and 5-6). The transmission lines would be noticeable to motorist traveling SR 161 for several miles. Use of medium, gray-painted structures versus Coreten structures could minimize the visual contrast associated with Option 1. As mentioned in the discussion of impacts for KOP #1a and #1b, colors with a low chroma (dull, grayish colors) tend to disappear or fade into the surrounding landscape with distance. By comparison, warm colors, particularly with light, attract attention and appear dominant in the landscape (see Figure 5-15). Additionally, temporary surface disturbance associated with installation of the structures and access roads would create visual contrast to the landscape for some time until the area became revegetated. Using either transmission line plant access Options 2 or 3 would reduce visual impacts associated with Option 1.

Transmission line plant access Options 2 and 3, where the transmission lines would cross or go around the toe of the mountain, would create a "weak" visual contrast to motorists traveling along I-15. Due to the distance of the transmission lines near the plant site, the structures would not be as noticeable. Additionally, use of the medium, gray-painted structures and nonspecular conductor would further reduce visual contrast (see Figure 5-15 Therefore, visual impacts associated with the transmission line plant access Options 2 and 3 would be negligible.

Visual impacts associated with transmission line plant access Option 4 would be similar to the impacts associated with Option 1. The contrast would be slightly less than Option 1 because one transmission line would cross the mountain versus three transmission lines (five circuits). Use of gray-painted structures and nonspecular conductor would reduce the level of visual impact associated with the line crossing. Additionally, as mentioned above in Option 1, visual contrast associated with temporary surface disturbance during construction would be visible to motorists along SR 161 for some time. The two transmission lines (four circuits) routed along the base of the mountain to the south would not be noticeable to the casual observer because they would be 4 to 5 miles from I-15. Using either transmission line plant access Options 2 or 3 would reduce visual impacts associated with Option 4.

5.1.12 Climate and Air Quality

Summary of Air Quality Impacts and Mitigation	
Significance Criteria: Violation of ambient air quality standards.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Short-term increase in PM_{10} and emissions from heavy equipment during site preparation and facilities construction, resulting in a negligible impact to regional air quality. Plant operations would result in negligible impacts to regional air quality.	Compliance with Clark County dust control regulations.
Access Roads: Short-term increase in PM_{10} and emissions from heavy equipment during road improvements resulting in a negligible impact to regional air quality.	Compliance with Clark County dust control regulations.
Water Treatment Plant: Short-term increase in PM_{10} and emissions from heavy equipment during site preparation and facilities construction, resulting in a negligible impact to regional air quality.	Compliance with Clark County dust control regulations.
Water Supply Pipeline: Short-term increase in PM_{10} during pipeline installation resulting in a negligible impact to regional air quality.	Compliance with Clark County dust control regulations. Revegetation of disturbed areas, following construction.
Transmission Lines: Short-term increase in PM_{10} during construction resulting in a negligible impact to regional air quality.	Compliance with Clark County dust control regulations. Revegetation of temporarily disturbed areas, following construction.

Air quality impacts would result from increased dust that would be created during land clearing, site preparation, and vehicle movement. Wind-driven dust also would be increased as a result of land disturbance. Construction equipment, earthmoving equipment, and vehicle operations also would result in increased emissions at work sites. Emissions from the Ivanpah Energy Center would result from plant operations; however, best available control technology would be used to minimize levels. Impacts to air quality would not be significant. An Air Permit application has been submitted to Clark County for the Goodsprings Plant Site. Approval for the facility is pending.

Proposed Goodsprings Plant Site Significance Criteria

Criteria Air Pollutants

Potentially significant air quality impacts from the operation of the Proposed Project were evaluated against criteria based on federal, state, and local pollution standards and regulations. Impacts on air quality are considered to be significant if project emissions would:

- Be inconsistent with the Section 12 or Section 15 of the Department of Air Quality Management (DAQM) regulations. These sections set forth requirements for pollution controls, emission offsets, air quality modeling, air quality monitoring, and continuous emissions monitoring.
- Increase ambient air pollutant levels from below the Ambient Air Quality Standards to levels above these standards.
- Maximum predicted Prevention of Significant Deterioration (PSD) impact levels exceed the allowable PSD increments (nitrogen dioxide, NO_2 (annual), 25 $\mu g/m^3$; PM_{10} (24-hr): 30 micrograms per cubic meter ($\mu g/m^3$); PM_{10} (annual): 17 $\mu g/m^3$.

Toxic Chemical Substance Criteria

Ammonia will be the only DAQM regulated toxic chemical substance emitted from the project (ammonia slip from the Selective Catalytic Reduction [SCR] system used for nitrogen oxides [NOx] control). The impacts of ammonia emissions will be considered insignificant if the maximum predicted ammonia ambient concentrations would be less than the DAQM threshold concentration of 405 $\mu g/m^3$.

Emission Sources and Applicable Air Quality Regulations

Emission Sources

The Ivanpah Energy Center will use two Westinghouse 501 FD gas-fired combustion turbine generators (CTGs), each with a heat recovery steam generator (HRSG). The HRSGs will capture exhaust heat to generate steam that will be supplied to a steam turbine generator. The projected average capacity of the combined-cycle plant will be 517 MW. One 8 MMBtu/hr gas-fired auxiliary boiler will be used for plant maintenance during shutdowns. Air contaminant emissions will be associated with the two CTGs, and the auxiliary boiler. Following conversion, Btu ratings are expressed in low heating value (LHV) for the CTGs and in high heating value (HHV) for the boiler. HHV is 11 percent greater than LHV for natural gas.

Applicable Air Quality Regulations

The Clark County Department of Air Quality Management (DAQM) has promulgated air quality regulations for the purpose of attaining and maintaining ambient air quality standards. The proposed project will be subject to Section 12 of these regulations – Preconstruction Review for New or Modified Stationary Sources. Section 12 sets forth requirements for pollution controls, air quality modeling, air quality monitoring, and continuous emissions monitoring. Due to a recent decision of the U.S. District Court, Section 15 of the DAQM regulations – Source Registration also is applicable. When Section 12 was adopted, Section 15 was repealed because the requirements in Section 12 superceded those in Section 15. However, in December 2001, the U.S. District Court refused an appeal of an earlier ruling that remanded Section 15 back to the DAQM. Thus, at this time, both Section 12 and Section 15 govern review of the new stationary sources. Their requirements conflict in some instances; where conflicts occur, the more stringent requirement must be met. Important aspects of either rule can be categorized as follows:

Emission Controls: Best Available Control Technology (BACT) or Lowest Achievable Emission Rate (LAER).

- Emission Offsets.
- Air Quality Impact Analysis.

- Continuous Emission Monitoring.
- Trigger thresholds for the above.

Source requirements differ by pollutant, depending on emission rate and air quality status of the project site. As discussed in Section 4.12, Clark County is divided into thirteen airshed regions, each of which is evaluated separately regarding air quality status. On a pollutant-by-pollutant basis, the air quality status of an airshed region can be non-attainment, management, or Prevention of Significant Deterioration (PSD). Requirements also differ in some cases depending on whether or not the source is a major source. Major source status is dependent on annual potential to emit (PTE) (i.e., permitted emissions) and the airshed status.

The proposed project is in the Ivanpah Valley Airshed of Clark County, which is designated attainment for all criteria air pollutants. This airshed also is designated by DAQM to be a management area for ozone. This designation affects requirements for NOx and VOC, both of which are ozone precursors. Control technology requirements for the PSD sources are Best Available Control Technology (BACT). Lowest Achievable Emission Rate (LAER) is required instead of BACT if VOC emissions would be greater than 50 tons per year (tpy). LAER is equal to or more stringent than BACT. However, VOC emissions for this project will be less than 50 tpy. Therefore, the BACT standard is applicable. In general, BACT is the maximum degree of reduction in pollutant emissions taking into account energy, environmental, and economic impacts and other costs. Emission offsets are not required for sources located in the attainment areas.

Continuous emissions monitoring refers to in-stack monitoring, on a continuous basis, for the purpose of determining whether a source is emitting a pollutant within its permitted limits. Ambient air quality monitoring refers to monitoring the outside air. Ambient monitoring is done to determine whether air quality standards are exceeded. In the context of DAQM Sections 12 and 15, ambient monitoring, if required should be conducted in the area of maximum project impacts. Air quality modeling involves estimating the impact of the new source, in combination with all other sources impacting the project area. Its purpose is to determine whether ambient air quality standards or PSD increments might be exceeded as a result of the new source. PSD increments are similar to air quality standards except that they involve emissions only from relatively newer sources in the area, as described in the air quality modeling section. Additional impact analysis refers to air quality impacts other than ambient air concentrations, such as visibility, or impacts to soils and vegetation.

Air Pollution Controls and BACT

The two CTGs will be equipped with state-of-the-art air pollution control systems, including:

- Dry Low NOx (DLN) burners and Selective Catalytic Reduction (SCR) systems to control NOx emissions to no more than 2.5 ppmvd at 15% O_2.
- An oxidation catalyst to control CO emissions to no more than 4 ppmvd and VOC emissions to no more than 2.3 ppmvd, both referenced to 15% O_2.
- SO_2 and PM_{10} emissions would be kept naturally low by use of natural gas as fuel. This will result in maximum SO_2 emissions of 0.0009 lb/MMBtu (LHV) and PM_{10} emissions of 0.0066 lb/MMBtu.

The auxiliary boiler would be used to maintain steam pressure in the CTGs when

they are down for short periods in order to enable a quick restart. Air pollutant emissions from the auxiliary boilers would be limited to the levels described below.

- Low-NOx burners to control NO_2 0.08 lb/MMBtu.
- Efficient combustion control to limit CO emissions to 0.08 lb/MMBtu and VOC emissions to 0.005 lb/MMBtu;
- SO_2 and PM_{10} emissions would be kept naturally low by use of natural gas as fuel. This would result in maximum SO_2 emissions of 0.0008 lb/MMBtu (HHV) and PM_{10} emissions of 0.0072 lb/MMBtu. The SO_2 emission factor is based on 0.30 grains sulfur per 100 scf gas. However, a review of sulfur measurements between January 1999 and February 2001, as provided by the Kern River Gas Transmission Company, showed that actual sulfur content averaged only 0.055 gr/100 scf during that period (18 percent of the assumed value) and did not exceed 0.083 gr/100 scf on a monthly average basis.

As shown in Table 5-12, BACT is required for all the pollutants (NOx, CO, SO_2, VOC, and PM_{10}). A final BACT determination will be made by the DAQM during its review of the air quality permit application for the proposed facility. In any event, emissions will be no higher than those associated with the factors given above.

Criteria Pollutant Emissions

For purposes of calculating emissions, the CTGs have been assumed to operate 24 hrs/day and 365 days/yr (8760 hrs/yr). In reality, they will be down approximately 400 hrs/yr for maintenance, and possibly more depending on market conditions. Emissions calculations for the CTGs were made based on a projected average output of 517 MW. The auxiliary boiler has been assumed to operate 150 hrs/yr, for a maximum of 3 hrs/day, as represented by the applicant.

Emissions for the CTGs were calculated using the emission factors stated above and the projected average plant capacity as provided by the design engineering firm, Harris Group. Two cases were used to determine average operating conditions, and thus, capacity. One case was for an average summer day and the other was for an average winter day, based on a five-year record of temperature and humidity from McCarran International Airport. Ambient and operating conditions for the two cases and the average case are shown in Table 5-13. A projected average heat rate of 5,983 Btu/kWh was calculated by the Westinghouse Gate-Cycle Model based on ideal conditions. However, for the purpose of calculating maximum potential emissions, a heat rate of 6,600 Btu/kWh has been assumed so as not to underestimate emissions.

Table 5-14 shows hourly emissions and Table 5-15 shows annual emissions associated with the CTGs, and the auxiliary boiler. Emissions for the CTGs and the auxiliary boiler were calculated using the emission factors discussed and the operating conditions shown in Table 5-13. The total emissions shown in both tables include only the CTGs because the auxiliary boiler will only run when the CTGs are shut down. The worst-case total emissions are represented by the case when both CTGs are running 8,760 hrs/yr and the auxiliary boiler is not operating. (The auxiliary boiler would not operate concurrent with the CTGs).

Annual emissions for the CTGs are equivalent to hourly emissions because of the conservative assumption that the plant will run 8,760 hrs/yr. In the case of the auxiliary boiler, limited annual operating hours, as

discussed above, are included in the calculations.

During periods of turbine start-up or shut-down, emissions control equipment is less effective, or not effective, because the exhaust gas temperatures during those times are lower than the optimum level needed for the catalyst to work. It is difficult to predict the number of shut-down/start-up cycles per year. In an ideal case, there would be two such cycles per year for routine maintenance. However, market conditions could dictate a higher frequency. Short-term emission rates for 501FD turbines during start-up/shut-down cycles have been estimated for the Reliant Energy Arrow Canyon Project in Clark County, as shown in the DAQM Technical Support Document (TSD) for the project's air quality permit. Hourly emission rates and duration of the cycle, as shown in the Arrow Canyon TSD, are provided in Table 5-19 for cold start, warm start, hot start, and shut-down. SO_2 emissions would be lower than during base load generation because less gas is used.

Toxic Chemical Substance Emissions

As mentioned above, ammonia will be the only DAQM regulated toxic chemical substance emitted from the project (ammonia slip from the SCR system used for NOx control). It was estimated that the maximum emission rate of ammonia from each stack would be 25.8 lb/hr.

Air Quality Analysis for Criteria Pollutants

Construction Phase Impacts

The majority of impacts to air quality during construction are expected to occur during the first few months of construction when earthwork related to site preparation and road grading activities will be the greatest. After surfacing of the temporary access road has been completed, construction-related impacts to air quality would be limited to exhaust from heavy equipment related to the installation of the transmission line and the natural gas metering station and pipeline components.

Site preparation would include clearing, grading, excavation of foundations, and backfilling of trenches and ditches. Major equipment installation is expected to begin within the first six months of the 24-month-long construction period and be largely completed by the 18th month. Temporary and localized increases of criteria pollutant concentrations are expected to occur during construction of the proposed facility and ancillary facilities. The primary impact on air quality from construction would be dust generation. Dust control activities would be implemented under Section 94 of the Air Pollution Control Regulations on mitigating impacts of construction activities.

The secondary source of emission during construction would be equipment exhaust. These sources would be widely dispersed. Emissions from equipment are temporary and would only occur over the construction period. Potential receptors are unlikely to be impacted and resultant impacts are likely to be negligible.

Operation Phase Impacts – Air Quality Modeling

Air dispersion modeling studies were performed to analyze the operational phase impacts of the project. The details of the air quality modeling studies are presented below.

Based on the criteria shown in Table 5-12, DAQM regulations would require air quality modeling for NOx, CO, SO_2, and PM_{10}.

Modeling procedures are described in the DAQM's "Draft Guideline on Air Dispersion Modeling" (CCHD, 1996). The Guideline specifies that the Industrial Source Complex Short-Term Model (ISCST3) is preferred for most applications. The ISCST3 model is also listed as a preferred model by the USEPA in its Guideline on Air Quality Modeling (40 CFR 51, Appendix W). Accordingly, ISCST3 has been used for the air quality analysis described herein. Data needed for input to the air quality model include source emissions and stack characteristics, meteorology, topography, and a receptor grid defining points at which air quality impacts will be calculated. DAQM procedures require first that the "significant impact area" attributable to the proposed source be established for each pollutant modeled. This involves running the model for the source emissions alone and determining areas where source impacts exceed prescribed significance levels. These significance levels are shown in Table 5-16. The area around the source in which significance levels are exceeded will almost always be irregularly shaped due to directional variations in meteorology and topography.

DAQM procedures allow for the significant impact area to be determined from modeling results in either of two ways. The first method requires identifying the distance farthest from the source in any direction at which the significance level is equaled or exceeded. Using that distance as a radius, a circle is defined with its center at the source location. The significant impact area is the entire area within the circle. The second method involves drawing a rectangle around the source that includes all points at which impacts above the appropriate significance level were calculated. The significant impact area is represented by the entire rectangle. In either case, there will be portions of the significant impact area where impacts are less than significance levels as a result of defining a regular geometric shape around the irregular area of actual significant impacts.

If there is no significant impact area identified (i.e., the maximum concentration due to the source is less than the significance level), then source air quality impacts are considered *de minimis* and no further modeling is required. However, if a significant impact area is identified, then an additional modeling run should be made that includes, in addition to the proposed source, all other sources that have significant impacts of their own within the proposed source's significant impact area. Results of that run are used to determine compliance with air quality standards and PSD increments.

PSD increments are air quality concentrations that cannot be exceeded when emissions of so-called PSD sources are considered. PSD emissions are generally defined as emissions increases and decreases that have occurred following the first application for a major source in the air quality control area after passage of the Clean Air Act Amendments of 1977. The precise definition is more complex. The DAQM has pre-determined PSD sources as discussed below in Source Input Data.

PSD increments are defined separately for different PSD area types, called Class 1, Class 2, and Class 3 areas. Class I areas are areas where special protection is afforded due to their pristine nature, or the federal goal of attaining such a nature. The PSD Class I area nearest the project site is the Grand Canyon National Park, about 100 miles to the east. PSD regulations apply to Class I areas only if they are within 100 km (62 miles) of the project site. There are no

Class 3 areas in the vicinity of the site, including all of Nevada, California, and Arizona. Thus, only the Class 2 increments are applicable for this project.

Receptor Grid

A receptor grid for the entire Ivanpah Valley was provided by the DAQM. The grid consisted of receptor locations on a north-south oriented rectangular grid with 500 meter spacing in both the north-south and east-west directions. The UTM Zone 11 coordinate system was used, as defined on USGS topographic maps. The grid was aligned with the 500 and 1000 meter points of the UTM coordinate (e.g., 642000 m, 3962500 m). The elevation above sea level, in meters, was defined for each receptor point in the DAQM supplied grid. In reviewing the supplied grid in the vicinity of the proposed project, it was determined that receptor elevations disagreed with those on the 7.5 minute USGS topographic map by up to several hundred feet and the actual elevations were generally lower than indicated by the file. Elevations seen by the model, especially those near the emissions source, can have a substantial affect on model results. Therefore, elevations on the Goodsprings, Nevada 7.5 minute USGS map were carefully read for the following area around the plant: 641500 m to 644500 m Easting, and 3961000 m to 3963500 m Northing. UTM coordinates for the eastern-most CTG stack (Stack 1) are approximately 643270 m E, 3962950 m N. Corrections were not made more than about 500 meters north of the plant because the area north of that is in the Goodsprings Valley and relatively flat for several kilometers beyond. Flat terrain areas are of less concern than elevated areas when modeling to find maximum impacts.

The DAQM supplied grid was augmented, based on the Guideline, with a subgrid surrounding the plant. The subgrid consisted of 36 receptors along the plant boundary, one every 10 degrees as measured radially from the eastern most CTG stack. Elevations for these receptors were taken to be equal to the stack base elevation, or 1025.8 meters (3365 ft) above sea level.

Meteorological Data

Meteorological data needed for model input include wind speed, wind direction, temperature, atmospheric stability and mixing height. Hourly data containing these parameters is available from McCarran International Airport for a consecutive five-year period and from Jean, Nevada for a consecutive one-year period. However, the DAQM has determined that these data sets are not representative of the project site due to complex wind patterns engendered primarily by varying topography in the area.

Because of the lack of acceptable data, a hypothetical worst-case screening set of data was developed as follows:

- 180 wind directions were represented, one for every two degrees clockwise around the compass, starting at north on the UTM grid (zero degrees).
- For each wind direction, a set of 47 wind speed and stability class combinations were included. These combinations include all that are used in the EPA screening air quality model SCREEN3. The wind speed and stability combinations used are shown in Table 5-17.
- All simulated conditions were assigned an ambient air temperature of 293°K (°K = degrees Kelvin) (68°F), which is approximately the annual average temperature in the project area.

- All simulated conditions were assigned a mixing height of 1,000 meters, as recommended by DAQM.

Each wind speed/stability combination, each matched with a given wind direction and mixing height, is taken by the model to represent average conditions over a particular one-hour period. Classes A through F represent various stages of atmospheric stability, with Class A being the most unstable and Class F being the most stable. Greater atmospheric dispersion of pollutants occurs with higher wind speeds and with less stability (or greater instability). Classes A through C represent unstable conditions, in varying degrees. Class D represents neutral conditions, and Classes E and F represent stable atmospheric conditions.

Use of this screening set of meteorological conditions is appropriate only for calculating one-hour average concentrations because the meteorological conditions each represent a single hour. The ISCST3 model can calculate pollutant impacts for averaging periods greater than an hour by averaging consecutive impacts for consecutive hours at a given receptor location. However, since hypothetical data are used, consecutive hours in the data file used here do not represent sequential meteorological conditions. Therefore, it is necessary to use an alternate method to estimate pollutant concentrations for periods longer than one hour. The standard widely accepted method, including by DAQM and USEPA, is to use time scaling factors with the one-hour impacts to estimate for the longer periods. The time scaling factor for an n-hour period is the ratio of the concentration for the n-hour period divided by the one-hour concentration. Thus, to estimate the n-hour concentration from the one-hour concentration, the latter is multiplied by the appropriate scaling factor. The following time scaling factors are recommended by DAQM and USEPA and are used in this modeling analysis:

Averaging Period	Time Scaling Factor
3-hr	0.9
8-hr	0.7
24-hr	0.4
Annual	0.1

Thus, for example, a maximum 1-hour concentration of 10 would indicate a maximum 24-hour concentration of 4. Since these ratios are used for screening purposes, their use is generally very conservative relative to impacts that would be calculated with actual sequential meteorological data, or that would occur in the real world.

Source Input Data

Source data input for the air quality model includes emission rates for the project, as previously described, as well as other information about the stack that affects pollutant dispersion. The stack data shown in Table 5-18 were used for model input.

If there are nearby structures that can affect the airflow of the plume due to wake effects, these must also be considered for building downwash effects. Based on USEPA guidance, flow from a stack can be affected by a nearby structure if the stack is less than Hs, where Hs = H + 1.5L. Here, H is the height of the structure, and L is the lesser of the height or width of the structure in the downwind direction. The structure is "nearby" if it is within 5L of the stack.

Structures meeting these criteria are the air-cooled condenser and the two HRSGs. Dimensions of these structures (H x L x W) are as follows:

- Condenser .64' x 460' x 131'
- HRSGs (each) .94' x 83' x 33'

The BPIP computer program is available from USEPA (www.epa.gov) to calculate ISCST3 model input parameters for building downwash. BPIP was run for this analysis using the structure dimensions listed above, along with stack heights and the coordinates of the stacks and structures. The results were entered as input to the ISCST3 model.

Similar information for other sources of NOx and PM_{10} in the Ivanpah Valley was provided by the DAQM in an electronic data file. In addition to existing sources, the recently approved Reliant Energy Bighorn power plant at Primm, Nevada and the planned regional airport south of Jean, were included in the DAQM file. Emissions from the proposed airport are represented in the DAQM modeling file as two sources at two points within the airport property. These emissions were distributed within two tall vertical columns, each about 600 meters tall and about 1.7 miles apart. This configuration was apparently to simulate the vertical range of aircraft while landing and taking off. However, the columns are only about 5 meters wide, and so do not fully simulate the horizontal extent of these emissions. This configuration in the model input is likely to over predict actual airport impacts by a large margin in the areas nearby to those source locations.

Sources qualifying as PSD sources were identified as such in the data file. This information was used in combination with project emissions data to assess compliance with air quality standards and PSD increments. PSD sources included the proposed project, the planned airport, and the Reliant Energy Bighorn power plant.

Prevention of significant deterioration (PSD) should be included in the air quality analysis.

Modeling Results

Based on the criteria in Table 5-12, modeling was indicated for NO_2, CO, SO_2, and PM_{10}. The ISCST3 model was run first on stack emissions alone to determine the extent of the significant impact area. Results of the project-only modeling runs, running at baseload conditions (i.e., full power), are summarized in Table 5-20. Maximum impacts in all cases were predicted to occur about 1.5 km W to WNW of the CTG stacks. For this analysis, all NOx emissions were assumed to convert to NO_2, although it is unlikely that full conversion would occur before the point of maximum impact.

The maximum impact exceeded the significance level for the NO_2 annual concentration and the PM_{10} 24-hour and annual concentrations. Thus, further modeling was required for NO_2 and PM_{10}. CO and SO_2 impacts are considered insignificant by USEPA and DAQM standards, and no further modeling would be required for these pollutants.

Isopleth maps of maximum NO_2 and PM_{10} impacts from plant emissions are shown in Figures 5-18 through 5-20 as follows:

- Figure 5-18 .Project NO_2 Annual
- Figure 5-19.Project PM_{10} 24-hour
- Figure 5-20.Project PM_{10} Annual

For annual concentrations of NO_2 and PM_{10}, the isopleths represent the calculated annual average concentrations as geographically indicated. The 24-hour PM_{10} isopleths represent a composite of maximum 24-hour average concentrations over a one-year period. That is, the indicated concentration at a single point is the maximum 24-hour average concentration one might experience

at that location over the course of a year. The lowest valued isopleth on each map is equal to the significance level. Thus, these maps define the areas in which impacts were above the significance levels. Impacts above the significance level are in the higher elevation areas as can be seen on the maps. The small, regularly-spaced dots represent the receptor grid. The project site is surrounded by an additional set of receptors, defining the site boundary.

The significant impact area for PM_{10} is smaller than for NO_2, as can be determined from the extent of the isopleths in Figures 5-18 and 5-20. However, to simplify the modeling runs and for presentation purposes, the receptor grid for the larger NO_2 impact area was used for all modeling runs. The higher concentrations occurred in elevated terrain, as can be seen from these figures.

Additional modeling runs were made for NO_2 and PM_{10} that included, in addition to project sources, all existing and proposed sources in the Ivanpah Valley, as provided by the DAQM. As allowed by ISCST3, sources were grouped as either PSD Sources or All Sources. Project emissions were included in both of these groups. The receptor grid previously described was used as model input.

Impacts from all sources were used for comparison to ambient air quality standards, and impacts from only those sources in the PSD group were used for comparison to PSD increments. Because all predicted impacts are representative of a one-hour averaging period, time-scaling factors, as previously described, were applied to estimate 24-hour average and annual average concentrations.

Table 5-21 shows maximum PSD and total impacts in the significant impact area from all appropriate sources, depending on whether the comparison is to PSD increments or to air quality standards. Figures 5-21 through 5-26 show the area-wide impacts when all PSD sources, and all sources combined, are considered in the modeling analysis. These figures are numbered as follows:

- Figure 5-21 PSD NO_2 Annual
- Figure 5-22 PSD PM_{10} 24-Hour
- Figure 5-23 PSD PM_{10} Annual
- Figure 5-24 Total NO_2 Annual
- Figure 5-25 Total PM_{10} 24-Hour
- Figure 5-26 Total PM_{10} Annual

The maximum NO_2 impact from PSD sources is 31.6 $\mu g/m^3$, which exceeds the allowable increment of 25 $\mu g/m^3$. This impact, which occurs at the southeast comer of the receptor grid, was determined to be almost entirely (more than 99 percent) from estimated airport emissions. As stated previously, the heavy concentration of all airport emissions at two points would tend to greatly over predict actual impacts from airport sources of NOx. Actual emissions would be distributed fairly widely across the airport property. The maximum contribution from the project at the location of maximum PSD impact, as well as at all locations where the PSD impact was 20 ug/m^3 or greater, was 0.1 ug/m^3. Thus, the proposed project would have a negligible impact at all locations where an exceedance of the PSD increment is calculated. Thus, operation of the Ivanpah Energy Center can be considered to have no impact at these locations.

The maximum PSD impacts for PM_{10} emissions are 16.7 $\mu g/m^3$ and 4.2 $\mu g/m^3$ for 24-hour and annual averaging periods, respectively. These impacts, while conservative due to the screening nature of the modeling, are nevertheless well below the allowable increments. In this case,

project emissions contributed the entire amount to the impact. As can be seen from Figures 5-22 and 5-23, project impacts of these magnitudes are limited to a relatively small area in the vicinity of the plant site.

Impacts from all sources, existing and proposed, are labeled "Maximum Total Impact" in Table 5-21. Calculated annual NO_2 impacts are just 32 percent of the air quality standard, and 85 percent of that impact is due to airport emissions. As with PSD NO_2 impacts, the maximum concentrations occurred in the southeast corner of the receptor grid (Figure 5-21). The project impact at the point of maximum total NO_2 impact is, again, only 0.1 ug/m^3, a negligible amount. Calculated maximum total PM_{10} 24-hour and annual impacts are 12 percent and 9 percent of the applicable air quality standards. In these cases, maximum impacts are the same as the maximum impact points for the proposed source, as can be seen in Figures 5-22 and 5-23. Project impacts at the same locations represent the majority of the impacts.

Air Dispersion Modeling for Toxic Chemical Substance - Ammonia

Air dispersion modeling studies were also performed for the emissions of ammonia from the HRSG stacks. The results of the modeling studies predicted a maximum 1-hr average concentration of 96 ug/m^3. This is considerably lower than the DAQM threshold concentration level of 405 ug/m^3.

Summary and Conclusions

Maximum potential criteria pollutant emissions were calculated and a conservative modeling analysis was performed to estimate impacts of the project on local air quality. Based on this analysis, the project would not contribute to a violation of any PSD increment or national ambient air quality standard. Thus, the project's air quality impact would be less than significant.

Deterioration of air quality and health issues associated with construction of the proposed project.

Maximum toxic chemical substance emission (for ammonia) was also calculated and a conservative modeling analysis was performed to estimate impacts of the project. Based on this analysis, the project would not cause ammonia concentrations exceeding the threshold limit established by the DAQM. Thus, the project's toxic chemical substance impact would also be less than significant.

Table 5-12
Air Quality Requirements

	NO_x	CO	SO_2	VOC	PM_{10}
Ivanpah Valley Airshed Status	PSD; Management Area for O_3	PSD	PSD	PSD; Management	PSD
Control Technology	BACT	BACT	BACT	LAER, if ≥50 tpy; BACT if <50 tpy	BACT
Emission Offsets	No	No	No	No	No
Continuous Emission Monitoring	Yes, if PTE ≥ 40 TPY	Yes, if PTE ≥ 100 TPY	Yes, if PTE ≥ 40 TPY	No	No
Ambient Air Monitoring	Yes, if impact ≥14 µg/m^3 (annual)	Yes, if impact ≥ 500 µg/m^3 (8-hr)	Yes, if impact ≥ 13 µg/m^3 (24-hr)	Yes, if PTE ≥ 40 tpy (no impact level applies)	Yes, impact ≥ 10 µg/m^3 (24-hr)
Air Quality Modeling	Yes	Yes	Yes	No	Yes
Additional Impact Analysis	Yes	Yes	Yes	Yes	Yes

Table 5-13
Plant Operating Conditions

Parameter	Units	Winter Case	Summer Case	Average Case
Ambient Temperature	Deg. F	50.9	83.5	67.2
Relative Humidity	%	38.5	22.1	30.3
Plant Elevation	Ft ASL	-	-	3,100[a]
Net Power Output	MW	523.9	509.6	516.8
Heat Rate	Btu/kWh	5,892	6,074	5,983[b]

[a] Actual plant elevation is 3365 ft. The assumed elevation of 3100 ft, used in the exhaust flow calculations, results in slightly higher mass flow rate, and correspondingly higher emissions, compared to 3365 ft elevation.

[b] A heat rate of 6600 Btu/kWh has been assumed for emissions estimation purposes.

Table 5-14
Hourly Air Emissions
(lb/hr)

Equipment	NO_x	CO	SO_2	VOC	PM_{10}
CTG No. 1	17.45	16.99	1.55	5.59	11.26
CTG No. 2	17.45	16.99	1.55	5.59	11.26
TOTAL – CTGs only[a]	*34.91*	*33.98*	*3.09*	*11.17*	*22.52*
Auxiliary Boiler	*0.64*	*0.59*	*0.01*	*0.005*	*0.06*
Emergency Fire Water Pump Engine	5.29	8.90	0.001	0.07	0.05

[a] CTG values shown may not sum exactly to total due to round-off

Table 5-15
Annual Air Emissions
(tons/yr)

Equipment	NO_x	CO	SO_2	VOC	PM_{10}
CTG No. 1	76.4	74.4	6.8	24.5	49.3
CTG No.2	76.4	74.4	6.8	24.5	49.3
TOTAL – CTGs only[a]	152.9	148.8	13.5	48.9	98.6
Auxiliary Boiler	*0.048*	*0.044*	*0.0005*	*0.003*	*0.004*
Modeling Required? (See Table 5-12)	Yes	Yes	Yes	No	Yes
Emergency Fire Water Pump Engine	0.014	0.023	0.00004	0.002	0.001

[a] CTG values shown may not sum exactly to total due to round-off

Table 5-16
Modeling Significance Levels
($\mu g/m^3$)

Pollutant	Annual	24-hour	8-hr	3-hr	1-hr
NO_x	1	-	-	-	-
CO	-	-	500	-	2000
SO_2	1	5	-	25	-
PM_{10}	1	5	-	-	-

Table 5-17
Wind Speed and Stability Conditions Used for Meteorological Data File

Stability Class	Wind Speeds (m/sec)
A	1.0, 1.5, 2.0, 2.5, 3.0
B	1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0
C	2.0, 2.5, 3.0, 4.0, 5.0, 7.0, 10.0, 12.0, 15.0
D	1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 7.0, 10.0, 12.0, 15.0, 20.0
E	1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0
F	1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0

Table 5-18
Stack Data

Parameter	Units	CTG Stack 1	CTG Stack 2
Height	ft	150	150
Diameter	ft	20	20
Gas Exit Velocity	ft/sec	58	58
Gas Exit Temperature	°F	219	219
X-coordinate	UTME (m)	643,330	643,283
Y-coordinate	UTMN (m)	3,962,800	3,962,783

Table 5-19
Estimated CTG Start-up and Shut-down Emissions

Description	Emissions (lb/hr)			
	NOx	CO	VOC	PM_{10}
Start-up: Cold Start Duration: 4 hours	107.5	1302.9	126.5	34.4
Start-up: Warm Start Duration: 2.5 hours	84.4	787.2	78.0	26.3
Start-up: Hot Start Duration: 1.5 hours	148.9	858.5	79.3	22.8
Shut-down Duration: 1 hour	157.4	2045.9	193.6	45.6

Table 5-20
Modeling Results – Project Only

Base Load Conditions – Project Only				
Pollutant and Averaging Time		**Maximum Impact ($\mu g/m^3$)**	**Significance Level ($\mu g/m^3$)**	**Further Modeling Required?**
NO_2	Annual	6.5	1	yes
CO	1-hr	63.1	2000	no
CO	8-hr	44.1	500	no
SO_2	3-hr	5.0	25	no
SO_2	24-hr	2.2	5	no
SO_2	Annual	0.6	1	no
PM_{10}	24-hr	16.8	5	yes
PM_{10}	Annual	4.2	1	yes
Cold-start Conditions – Project Only				
Pollutant and Averaging Time		**Maximum Impact ($\mu g/m^3$)**	**Significance Level ($\mu g/m^3$)**	**Further Modeling Required?**
CO	1-hr	2417	2000	yes
CO	8-hr	869	500	yes
PM_{10}	24-hr	18.3	5	yes

Table 5-21
Modeling Results – All Sources

	NO_2	PM_{10}	
	Annual	24-Hour	Annual
Maximum Impact from All PSD Sources[a] ($\mu g/m^3$)	31.6	16.7	4.2
IEC Project Contribution to Maximum[b] ($\mu g/m^3$)	0.1	16.7	4.2
Allowable PSD Increment ($\mu g/m^3$)	25.0	30	17
Location (UTME, UTMN)	648000, 3956500	642000, 3963000	642000, 3963000
Maximum Total Impact from All Sources[a] ($\mu g/m^3$)	32.4	18.2	4.6
IEC Project Contribution to Maximum[b] ($\mu g/m^3$)	0.1	16.7	4.2
Air Quality Standard ($\mu g/m^3$)	100	150	50
Location (UTME UTMN)	648000, 3957000	642000, 3963000	642000, 3963000

[a] Sources modeled include proposed Ivanpah Valley Airport.
[b] maximum contribution of proposed IEC project at location of maximum impact

Access Roads

Modifications to the north and south access roads would require grading which would result in increased PM_{10} levels in the area during the initial three to four months of construction. Provisions stated in a Clark County Dust Control Permit would be followed, which would reduce the levels of dust generated during construction, thus resulting in negligible impacts to air quality. Although the north access road is infrequently used, paving would reduce the incidence of dust generated by vehicles entering the KRGT Gas Compressor Station and County Road 53Y.

Air quality associated with construction dust. Would access road be paved or sealed?

Water Treatment Plant

Construction of the water treatment plant, and the wastewater interconnection pipeline would result in increased PM_{10} levels during the period when the site is being cleared and during pipeline installation (approximately three to four months). The level of PM_{10} would be controlled (to the extent practicable) by use of water in accordance with the Clark County dust control permit. If the wastewater interconnection pipeline is installed (dependent upon treatment plant site selection), temporarily disturbed areas would be revegetated in accordance with BLM's approved restoration plan. Consequently, air quality impacts associated with dust are expected to be negligible. Air emissions related to operation of the water treatment plant are not anticipated; therefore, long-term (life of the project) impacts to air quality are not anticipated.

Water Supply Pipeline

Construction of the water supply pipeline would result in increased PM_{10} levels during the period of construction. The level of PM_{10} would be controlled (to the extent practicable) by use of water in accordance with the Clark County dust control permit. If the wastewater interconnection pipeline is installed (dependent upon treatment plant site selection), temporarily disturbed areas would be revegetated in accordance with BLM's approved restoration plan.

Transmission Lines

Construction of the transmission lines would result in increased PM_{10} levels during the period of construction. The level of PM_{10} would be controlled (to the extent practicable) by use of water in accordance with the Clark County dust control permit. Temporarily disturbed areas would be revegetated in accordance with BLM's approved restoration plan.

5.1.13 Noise

Summary of Noise Impacts and Mitigation	
Significance Criteria: Exceeds county noise standards at sensitive receptors.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Moderate short-term construction noise during 22-month period. Operational noise from plant to sensitive receptors expected to be negligible.	Limit vehicle movement by bussing workers to plant site. Limit construction activities to daytime hours.
Access Roads: Moderate short-term construction noise during the first three months of construction.	Limit working period to daytime hours.
Water Treatment Plant: Moderate short-term noise during construction. No impacts to area businesses during operations.	Limit working period to daytime hours.
Water Supply Pipeline: Negligible short-term construction noise during construction.	None required.
Transmission Lines: Moderate short-term construction noise during construction. No impacts during operations.	Limit working period to daytime hours in locations that may affect sensitive receptors.

Construction of the Ivanpah Energy Center at Goodsprings and related project components would result in temporary noise impacts due to equipment movement and construction activities. Although noise levels at sensitive receptors is likely to be low, primarily due to distance and intervening topography, its presence could be perceived as an annoyance to some residents of Goodsprings. Long-term impacts could result from plant operations. The severity of impacts would direct relate to the magnitude and amplitude of sound that is generated, duration of the sound, and the sensitivity of receptors that are impacted by the sound. Due to the remote setting of the Goodsprings plant site and related project components, impacts from noise would be less than significant.

Proposed Goodsprings Plant Site

Noise levels are measured in pitch and loudness. Pitch is the frequency of noise and is typically measured in cycles per second, or Hertz (Hz). Loudness is expressed in decibels (dB), which is based on sound pressure of micropascals (μPa). The lowest sound pressure that can be detected by an average human ear is 20 μPa, which equates to 0 dB. A sound pressure of 200 μPa equates to 140 dB, which is above the threshold of pain. The perceived loudness of a sound is not directly related to the sound pressure, since the sensitivity of the ear varies with the pitch (Hz) of the sound. The human ear is most sensitive to frequencies around 4,000 Hz (4 kHz) and is insensitive to frequencies below about 20 Hz or above 20 kHz.

Noise annoyance is perceived differently by individuals. In general, it is dependent upon the loudness (decibels) and pitch (Hertz). Other factors include the presence or absence of background noise loudness and pitch, its repetition rate, the time of day when it occurs, and numerous social and physiological factors. A consistent single pitch noise is typically more annoying than multiple pitch noise of the same loudness.

As previously referenced, the human ear is capable of perceiving noise ranging from 20 Hz to 20 kHz, and is most sensitive to frequencies around 4,000 Hz. Therefore, a "weighted" scale of frequencies has been developed to emphasize frequencies around 4,000 Hz and de-emphasize those of lower and higher frequencies. The "weighted" noise levels, which corresponds to that perceived by the human ear is expressed as decibels in the "A" scale, or dB-A. Typical noise levels that are associated with various activities are listed in Table 5-22.

Various agencies of the federal government and many local governmental entities have established standards that are considered to be acceptable noise levels. Those related to housing and residential areas, as established by the Housing and Urban Development Administration (1983), place maximum acceptable levels at 65 dB-A during daytime hours (7:00 a.m. to 10:00 p.m.) and 55 dB-A during nighttime hours (10:00 p.m. to 7:00 a.m.).

Table 5-22 Typical Noise Levels (A-weighted) by Activity

Noise Source (at given distance)	Scale of A-weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (relative to a reference loudness of 70 dB-A
Military Jet Take-off with Afterburner (50 ft.)	140	Carrier Flight Deck	
Civil Defense Siren (100 ft.)	130		
Commercial Jet Take-off (200 ft.)	120		Threshold of Pain (32 times as loud)
Pile Driver (50 ft.)	110	Rock Music Concert	(16 times as loud)
Ambulance Siren (100 ft) Newspaper Press (5 ft.) Power Lawn Mower (3 ft.)	100		Very Loud (8 times as loud)
Motorcycle (25 ft.) Propeller Plane Flyover (1,000 ft.) Diesel Truck, 40 mph (50 ft.)	90	Boiler Room Printing Press Plant	(4 times as loud)
Garbage Disposal (3 ft.)	80	High Urban Ambient Sound	(2 times as loud)
Passenger Car, 65 mph (25 ft.) Living Room Stereo (15 ft.) Vacuum Cleaner (3 ft.) Electric Typewriter (10 ft.)	70		Moderately Loud 70 dB-A (reference loudness)
Normal Conversation (5 ft.) Air Conditioning Unit (100 ft.)	60	Data Processing Center Department Store	(0.5 times as loud)
Light Traffic (100 ft.)	50	Private Business Office	(0.25 times as loud)
Bird Calls (distant)	40	Lower limit of Urban Ambient Noise	Quiet (0.125 times as loud)
Soft Whisper (5 ft.)	30	Quiet Bedroom	
	20	Recording Studio	Barely Audible (threshold of hearing)

Source: URS, 2001

The Ivanpah Energy Center plant site is approximately 2.3 miles from the nearest residents. Sensitive receptors in the vicinity of the proposed access roads, water supply pipeline and transmission lines are more than 2.0 miles from potential work sites. Construction noise associated with the movement of heavy equipment would extend over a 22-month period and would be centered on the 30-acre plant site and 10 acre temporary laydown area. Noise impacts at sensitive receptors in the Goodsprings area are expected to be negligible to moderate during construction and negligible during facilities operations.

What noise levels would be generated from the plant?

Construction of the Ivanpah Energy Center Plant and ancillary facilities is likely to create sufficient noise to be detectable in the community of Goodsprings. However, within the community, the intensity of noise sources such as that of heavy equipment movement is likely to be below ambient levels. Noise related to traffic would be ameliorated by use of buses to transport workers to and from the plant site during the 22-month plant construction period. On-site plant personnel are expected to range from 17 during the initial month of plant construction to as many as 280 during months 14 through 17 of plant construction. Average daily trips and peak daily trips during the construction period are shown in Table 5-23.

Table 5-23 Average Daily and Peak Daily Construction Traffic Trips

Average Daily and Peak Daily Construction Traffic Trips		
Vehicle Type	**Average Daily Trips**	**Peak Daily Trips**
Construction Personnel*	150	275
Delivery Trucks	5	10
Heavy Vehicles and Trucks	5	15
Total	160	300
*Would be reduced through use of buses.		

During normal operations at full generating capacity, primary noise sources associated with the Ivanpah Energy Center will include:

- combustion turbines – 70 dB-A at 6 feet (outside the enclosure)
- boiler feed pumps – 80 dB-A at 3 feet
- steam turbine-generator – 77 to 78 dB-A at 3 feet

Additional high levels of noise would occur as part of the steam bypass system, which activates as a safety release, when needed.

Plant operations noise levels were estimated through empirical modeling and compared to Clark County noise restrictions. Results of the modeling indicate that plant operations would not exceed maximum nighttime allowable levels of 49 dB-A at the proposed plant boundary. Estimated levels at the boundaries are as follows:

- north side boundary – 35.7 dB-A
- south side boundary – 35.1 dB-A
- east side boundary – 39.0 dB-A
- west side boundary – 39.0 dB-A

Based on these data, potential noise impacts associated with plant operations are not anticipated. Noise levels at sensitive receptors (more than 2.3 miles from the plant site) would be below nighttime allowable levels (as established by Clark County) and below those established by the Housing and Urban Development Agency.

Results of modeling indicate that noise associated with plant operations would be below maximum Clark County nighttime thresholds at the plant property line. Potential noise levels at the nearest sensitive receptor (a single-family residence along Sandy Valley Road) would be below maximum allowable levels established by the Housing and Urban Development Authority and are expected to be negligible.

Although it is unlikely that noise from the plant would be audible during normal operations, that of a steam bypass system, which activates as a safety release, may be audible by some residents.

Access Roads

Negligible to moderate short-term construction noise would be associated with grading and other road improvements to the north and south access roads. Due to its proximity to sensitive receptors in the Goodsprings area, it is likely that noise impacts related to construction of the north access road would result in greater short-term impacts than those associated with construction of the southern access road. Noise generated during construction of the southern access roads would be 2.5 to 6.0 miles from the nearest sensitive receptor in Goodsprings.

Water Treatment Plant

Construction of the proposed water treatment plant would be likely to result in short-term noise impacts to area businesses. However, due to distance and the presence of other noise-generating facilities (I-15 traffic, local road traffic, and railroad activities), it is likely that such impacts on area businesses would be minor (regardless of specific plant location selected). Although the facilities have not been designed, previous experience at typical "package plant" water treatment plants and pumps indicates that noise that would generated during plant operations would be very low and represent a negligible impact to area businesses.

Water Supply Pipeline

Noise impacts associated with the installation of the water supply pipeline would be similar to those of the southern access road. The level of such impacts to sensitive receptors would be short-term and negligible. Trenching for water line construction across the mountain west of the plant site (Option 1) is likely to result in slightly greater impacts to residents of Goodsprings than would result from construction across or around the toe of the mountain (Options 2 or 3).

Transmission Lines

Construction of the transmission lines (regardless of alternative) would result in short-term negligible impacts to sensitive receptors in the Goodsprings area. Construction of transmission lines across the mountain west of the plant site (either Option 1 or Option 4) would result in slightly greater impacts to residents of Goodsprings than would result from

construction of either Option 2 or 3. Noise impacts associated with the transmission lines when operational are not expected.

Potential Noise Effects on Wildlife

Moderate short-term impacts to wildlife are expected to result from construction of the Ivanpah Energy Center, access roads, water supply pipeline, and transmission line. The magnitude of such impacts would differ with each species.

Potential noise impacts to desert tortoise were reported by Power Engineers, Inc. (2002) in their Environmental Assessment entitled: *Northwest Service Upgrade – Centennial Plan for the Harry Allen – Northwest 500 kV Transmission Line* in which they point out that "Older tortoises are not apparently affected as much as younger juveniles, however, they are extremely adaptable to the intermittent projected noise (that would result from transmission line construction)." Power also states that research conducted by Bowles, *et al.* (1999) indicates that tortoise were tolerant of short-term exposures to sonic booms at 120 to 140 dB-A as well as aircraft noise of approximately 105 dB-A that extend approximately 40 minutes. Desert tortoise populations that would be most affected by construction would be located in Ivanpah and Eldorado valleys, along the southern access road, water supply pipeline, and transmission line. The severity of such impacts could be ameliorated by scheduling construction during periods when the species is inactive. Accordingly, the extent of such impacts to the species would be temporary and range from negligible to minimal.

What are the effects of noise on wildlife (e.g. the Desert Tortoise, Bighorn Sheep)?

Although noise effects on the desert tortoise is not well known, concern has been expressed that low frequency noise could contribute to disrupting behavior characteristics of the species. Potential impacts that could be associated with plant operations cannot be estimated due to lack of data about related species behavior, lack of noise frequencies data that would be emitted from the facility, and attenuation of such frequencies to adjacent lands.

Potential noise impacts to desert bighorn sheep are expected to result in species avoidance where human activity is extensive. Accordingly, it is likely that some individuals would be temporarily displaced, resulting in short-term minor impacts. The extent of impacts to the species is expected to be limited to construction of the IEC to Mead Transmission Line through the McCullough Range.

Based on discussions with members of the Fraternity of Desert Bighorn Sheep (Bentley, 2002), noise associated with blasting has little affect on bighorn sheep herds. However, helicopter over flights typically results in scattering of herds and places stress on individual animals. Consequently, the use of helicopters for pole setting and other activities should be restricted to mountain passes and flights over uplands should be avoided.

5.1.14 Socioeconomics/Environmental Justice

Summary of Socioeconomics Impacts and Mitigation	
Significance Criteria: Induced population growth that would exceed what is considered a normal growth. Substantial use of tax funds by the community that would not be compensated elsewhere. Permanent and irreversible loss of work for a major sector of the community.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Negligible impacts to population during the 22-month construction phase. Negligible short-term beneficial impact to employment during construction; negligible long-term beneficial impact to employment during plant operation. No short-term impacts to housing; negligible long-term impact to housing during plant operation. Negligible short-term and long-term impacts to schools. Potential Impacts to school transportation. No impacts to community infrastructure. Negligible impacts to property tax revenues. No disproportionate high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.	1. None required for population, employment, housing, schools, or property taxes. 2. Transport construction workers to plant site from off-site location. 3. Use of southern access road during construction to reduce impacts to school-related and other traffic on SR 161. 4. Environmental Justice: none required.
Access Roads: Similar impacts for population, housing, schools and property taxes as the plant site. Negligible short-term beneficial impacts to employment during construction. Potential impact to school transportation. Same impacts on Environmental Justice as the plant site.	1. None required for population, employment, housing, schools, or property taxes. 2. Use of southern access road during construction to reduce impacts to school-related and other traffic on SR 161. 3. None required for Environmental Justice.
Water Treatment Plant: Short-term beneficial impacts to employment during construction would be negligible. Negligible long-term beneficial impacts to property tax revenues. No impacts to environmental justice.	None required

Summary of Socioeconomics Impacts and Mitigation	
Water Supply Pipeline: Similar impacts to population, housing, schools, and property taxes as the plant site. Same impacts on Environmental Justice as the plant site. Negligible short-term beneficial impacts to employment during construction.	**None required**
Transmission Lines: Negligible beneficial short-term impacts to employment during construction. Same impacts on Environmental Justice as the plant site.	**None required**

Construction and operation of the Ivanpah Energy Center and related project components would result in beneficial impacts to Clark County and the Goodsprings community. Short-term benefits would include increased employment and tax revenues. Although the magnitude of such beneficial impacts can be measured when compared to the county as a whole, those to the community cannot be quantified. Construction workers for the project are likely to originate from the Las Vegas area or consist of workers on temporary assignment from other parts of the country. Due to the lack of housing availability within Goodsprings and proximity to Las Vegas, it is unlikely that construction or operation of the facility would affect population numbers, housing resources, or schools at Goodsprings. Construction or operation of the Ivanpah Energy Center or its project components would not impact minority or low-income populations; therefore, related impacts to such populations are not anticipated.

Proposed Goodsprings Plant Site

Population

Changes in population resulting from the construction and operation of the IEC plant and ancillary facilities are not expected. During the 22-month construction period, the majority of plant construction workers would most likely commute from the Las Vegas area. Even though the plant construction period would last for almost 2 years, peak construction activity would occur for approximately 9 months (month 10 through 18, See Table 5-24). Therefore, it is unlikely that workers would relocate to the communities of Goodsprings or Sandy Valley for the short duration of the peak construction period. Additionally, Goodsprings and Sandy Valley are small rural communities with little available housing; permanent housing is not available in the community of Jean. Consequently, the construction or operation of the IEC plant would not induce population growth; therefore, impacts to population would be negligible.

Employment

Economic benefits for local communities.

Construction of the proposed IEC plant and ancillary facilities would result in a short-term beneficial impact to employment in the region. During the peak construction period, the maximum number of construction workers would total approximately 287 workers. Personnel for construction of the plant and the ancillary facilities would be hired locally from the Las Vegas area and possibly from the communities Goodsprings and Sandy Valley. Training for local residents to work in construction or operation of the plant could be provided at the discretion of individual contractors.

The average prevailing wage rate for construction is $36.83 (State of Nevada, 2002). Table 5-14 below shows prevailing wage rate per hour by labor classification. Construction payroll costs over the 22-month plant construction period are estimated to be approximately $29 million (IEC, 2002).

Table 5-24 Estimated Construction Wages for Ivanpah Energy Center

(Based on 22-month construction period)

Classification	Person-months	Total Hours	Prevailing Wage Rate ($/hr)	Total Wages
Laborer	1,234	213,852	$ 31.00	$6,629,418
Carpenter/Millwright	292	50,604	$ 36.00	$1,821,730
Ironworker	163	28,248	$ 41.50	$1,172,288
Heavy Equipment Operator	143	24,782	$ 40.00	$ 991,276
Teamster	71	12,304	$ 31.00	$381,433
Electrician	496	85,957	$ 39.00	$3,352,315
Pipefitter	1,015	175,900	$ 42.00	$7,387,779
Boilermaker	346	59,962	$ 39.57	$2,372,688
Insulator	114	19,756	$ 42.50	$839,639
Painter	23	3,986	$ 33.00	$131,535
Cement Finisher/Mason	42	7,279	$ 33.00	$240,194
Mechanic	30	5,199	$ 36.00	$187,164
Surveyor	26	4,506	$ 41.00	$184,738
Admin. Staff	620	107,446	$ 30.00	$3,223,380
Total	4,615	799,780		$28,915,576

Notes: Prevailing wage rate from: State of Nevada, Department of Business and Industry, Office of the Labor Commissioner

2002 Prevailing Wage Rates, Clark County

Mechanic and Admin Staff estimated

Some rates represent weighted combination of journeyman, foreman, general foreman rates.

Additional employment opportunities would be created from businesses providing construction-related goods and services. It is estimated that $20 - $25 million will be spent locally on construction materials (IEC, 2001).

Approximately 16 new jobs would be created for plant operations. Employees would operate the plant rotating on four shifts. Twenty-five additional employees would be required to perform scheduled maintenance at the plant site twice a year (IEC, 2001). Long-term beneficial impacts resulting from plant operations employment would have a negligible effect to employment in the area.

Housing

Since most employees hired for construction of the IEC plant would commute from the Las Vegas area; it is unlikely that additional housing from the communities of Sandy Valley or Goodsprings would be required. The total housing vacancy rate in Clark County is 8.5 percent, about 47,546 housing units available for occupancy (2000 Census). Therefore, since there is a surplus of available housing in Clark County, short-term impacts and the need for additional housing are not expected during construction of the IEC plant.

Likewise, long-term impacts to housing are not anticipated as a result of plant operation. It is assumed that most of the full time plant employees would commute from the Las Vegas area where housing is readily available. Should employees relocate to the communities of Goodsprings or Sandy Valley, limited housing is available, but the impact would be negligible because the number of employees required for plant operation is relatively small.

Schools

As mentioned above, employees hired for construction and operation of the IEC plant would most likely commute from the Las Vegas area. It is assumed that students of employees would already be enrolled in Clark County School District. Long-term and short-term impacts to schools and school district resources resulting from construction or operation of the IEC plant would be negligible.

School bus transportation between Sandy Valley, Goodsprings, Jean, and Las Vegas may experience delays during the 22-month plant construction period. According to Clark County School District, two buses travel four times daily along SR 161 and Sandy Valley Road (Cardenas, 2002). With the exception of heavy equipment, impacts to school transportation associated with plant construction could be minimized by reducing the number of construction vehicles along SR 161 and transporting workers to the plant site from an off-site location. Additionally, impacts to school transportation could be minimized by using the southern access road, which would allow construction-related traffic to enter the plant site from the south near Jean at the intersection of SR 161 and I-15.

Community Infrastructure

The communities in the vicinity of the proposed IEC plant facility are small, rural communities where quality of life is highly valued. Since the plant site is not located within Goodsprings or Sandy Valley, it is unlikely that adverse impacts to public facilities (schools, churches, libraries, *etc.*) or traffic through these communities would

occur. Construction traffic would be confined to I-15, SR 161, and the access road to the plant site; consequently, disruption to daily activities within Goodsprings or Sandy Valley would be unlikely. The community of Jean could possibly experience an increase in traffic during the construction period; however, there are no permanent residents in Jean that would be affected.

The IEC plant facility would be self-supporting; therefore, the existing infrastructure of local communities would not be burdened with providing electrical service, water, or waste disposal services for construction or operation of the plant. Additionally, since additional housing resulting from employment during construction or operation of the plant is not anticipated, upgrades or expansion to existing services would not be required.

Fire protection services for the communities within the vicinity of the proposed IEC plant facility are provided by the Goodsprings volunteer fire department and the Clark County Fire Department. The plant facility would comply with all regulations required by the Clark County Fire Department and the National Fire Protection Association (NFPA) 850 "Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations." It is unlikely that the plant facility would create an additional burden on existing fire protection, medical emergency, and police protection services in the area.

Retail services such as restaurants and gas stations, particularly in Jean, would most likely experience short-term benefits to revenues with the additional number of construction workers in the area.

Tax Revenue

The proposed project would generate approximately $4 million in annual property tax revenues to Clark County (IEC, 2002). However, the beneficial impact of increased property tax revenues would be negligible to the communities of Goodsprings, Sandy Valley, and Jean.

Economic benefits for local communities.

Environmental Justice

There is no evidence that the proposed IEC plant will have a disproportionately high and adverse human health or environmental effects on minority and low-income populations. The proposed IEC project, was evaluated in terms of an adverse effect that:

a. is predominately borne by a minority population and/or low-income population; or,
b. will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or nonlow-income population.

There are no adverse human health or environmental effects resulting from this project or from a cumulative impact associated with land-use. Since there has not been any previous industrial use in the project area, and as neither community (Goodsprings or Sandy Valley) is adversely impacted due to their location vis-à-vis the project site, the proposed IEC project would not introduce or be an additional adverse industrial use located in a minority or low-income community.

Based on available census data, there is no indication that the residents of Goodsprings and Sandy Valley are predominately: a) of a minority race; and/or, b) composed of a low-income population.

Access Roads

Adverse impacts to socioeconomic resources resulting from the construction and/or improvements to the northern access road and the southern access road are similar to the impacts associated with the plant and ancillary facilities. A negligible beneficial impact to employment would occur during construction /improvement of the access road alternatives. Use of the southern access road would reduce short-term impacts associated with school transportation.

There is no indication that adverse impacts associated with Environmental Justice would occur resulting from this component of the proposed project.

Water Treatment Plant

Construction and operation of the water treatment plant would result in a beneficial impact to employment in the Las Vegas area. Short-term benefits would be derived from construction activities; long-term benefits would result from plant operations. Housing, schools, and community infrastructure would be unaffected, primarily because the proposed plant site (regardless of treatment plant site selection) is in an industrial setting that is absent of residences. Similarly, no impacts to environmental justice are anticipated. Plant operations would generate a negligible beneficial impact to Clark County tax revenues. The extent of beneficial impacts would be considerably less than those associated with construction of the Ivanpah Energy Center, but is likely to be negligible.

Water Supply Pipeline Route

Impacts to socioeconomic resources resulting from the construction of the water supply pipeline and water supply pipeline plant access options would be the same as the impacts associated with the plant site and ancillary facilities. Construction of the water supply pipeline would create additional employment opportunities resulting in a negligible beneficial impact to employment.

There is no indication that adverse impacts associated with Environmental Justice would occur resulting from this component of the proposed project.

Transmission Route Alternatives C and E

Transmission Route Alternatives C and E are located within BLM-designated utility corridors and are not within or adjacent to urbanized areas. Potential adverse impacts to the infrastructure of communities are not expected. Construction of any of the four transmission line alternatives would create additional employment opportunities during the 18- to 24-month construction period. The construction period includes three phases requiring approximately 45 to 67 total workers throughout the construction phases. Additional employment opportunities would be created from businesses providing construction-related goods and services. Negligible beneficial impacts to employment associated with construction of the transmission line would be relative to employment county-wide.

There is no indication that adverse impacts associated with Environmental Justice would occur resulting from this component of the proposed project.

5.2 ALTERNATIVE PLANT SITE F – PRIMM PLANT SITE

5.2.1 Geology and Minerals, Seismicity, Soils, and Mining

Summary of Impacts Related to Geology, Minerals, Seismicity, Soils, and Mining	
Significance Criteria: Erosion or siltation that would result in irreversible and unacceptable impacts to other resources. Loss of mineral resources that are not available elsewhere. Exposure of facilities or personnel to major geologic hazard (*i.e.*, seismic). Conflicts with existing mining activities that cannot be resolved through negotiation with mine operators.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Located on private land. Natural gas supply pipeline would temporarily disturb 19.4 acres of native soils; permanent loss of 0.5 acres of native soils for gas metering station resulting in negligible overall impacts to regional resources. Seismic hazard expected to be negligible. Potential impacts to active mining claims are not anticipated.	Soils disturbed during pipeline construction would be stabilized to the extent practicable. Revegetation would take place in accordance with BLM restoration plans.
Access Roads: Not applicable.	None required.
Water Treatment Plant: Permanent (life of the project) loss of approximately 0.7 acres of native soils.	Soil Disturbance would be minimized to the extent practicable.
Water Supply Pipeline: Temporary disturbance to 53 to 66 acres of native soils. Negligible soil erosion impacts. Potential impacts to active mining claims are not anticipated.	Soils disturbed during construction would be stabilized to the extent practicable. Revegetation would take place in accordance with BLM restoration plans.
Transmission Line: Negligible temporary disturbance to approximately 245 acres during construction. Negligible permanent (life of project) use of 8.3 acres of land. Potential impacts to active mining claims are not anticipated.	Soils disturbed during construction would be stabilized to the extent practicable. Revegetation would take place in accordance with BLM restoration plans. Modifications to structure locations can be made (to the extent practicable) to avoid potential impacts to mining claims and drainages.

GEOLOGY AND SOILS

Land that would be required to construct the Ivanpah Energy Center at Primm is privately owned and leased by Reliant Energy for industrial purposes. Although a portion of the land that has been previously cleared as part of the Reliant Bighorn Facility may be available for use for the Ivanpah Energy Center, additional lands are likely to be required. Additional land disturbance would be associated with installation of a gas metering station, adjacent to the KRGT, and a 3.2-mile-long natural gas supply pipeline from the KRGT to the plant site. Potential impacts to geological and soils resources at the plant site are not expected, due to previous disturbance and ownership status. Those related to the installation of the natural gas

pipeline would include exclusion of mining opportunities along the pipeline corridor and temporary disturbance to native soils.

Disturbance of lands would introduce the potential for increased soil erosion as a result of wind and water influences. Although such impacts are not expected to be significant, they would be greater within areas of relatively steep terrain, such as proposed transmission line corridors across Crystal Pass and across the McCullough Range. Other impacts include potential conflicts with mining claims and mining operations in the area.

The application of mitigation measures such as appropriate engineering designs and the use of appropriate construction materials would reduce the potential severity of impacts that are related to soil erosion. Additional mitigation measures that could be taken include the use of storm water retarding structures, channel protection measures, and revegetation of disturbed areas. Potential impacts to mining and mineral claims can be mitigated by through avoidance or through negotiated agreement with mining and mineral claim entities.

Primm Plant Site Alternative

Construction and operation of the Ivanpah Energy Center at Primm (including the natural gas supply line) would result in negligible impacts to geological or mineral resources within the area. Lands used for the facility would result in long-term and short-term disturbance to geological resources and soils; however, the plant site and laydown area would be on private land. Therefore, it is unlikely that the tract would be used for mining in the future.

A 3.2-mile-long natural gas supply pipeline would be installed from the KRGT pipeline, parallel to a similar natural gas pipeline for the Reliant Bighorn facility. Pipeline installation would result in temporary disturbance to 19.4 acres within a 50-foot-wide corridor; an additional 0.5-acre area would be needed at the KRGT pipeline for a 100 by 200-foot metering station. Separate metering stations and pipelines are needed to enable Reliant Bighorn and Ivanpah Energy Center to operate, regulate, and monitor gas flows to their respective facilities. No mining claims would be affected and areas that would be temporarily disturbed would be restored in accordance with BLM's approved restoration plan following construction and prior to returning the use of the land to the BLM.

Quaternary normal-faults bound several mountain ranges in southern Nevada, and the nearby Death Valley-Furnace Creek fault system is considered to be one of the most tectonically active structures in the Basin and Range Province (Dohrenwend *et al.*, 1991; Hannsen, 1991; Hart and Bryant, 1999). Although regional geologic maps do not indicate range-front BRP-type faults along the Spring Mountains (west of the Primm Plant Site Alternative) or the Lucy Gray Mountains (east of the plant site alternative), faulting is likely to be present in the area. However, potential impacts to facilities that would be related to seismic activity are expected to be negligible.

Access Roads

An existing paved road that is used for the Reliant Bighorn Plant would be used for the Ivanpah Energy Center, Primm location. Additional access roads are not required.

Water Treatment Plant

Installation of a water treatment facility would result in the permanent (life of the project) loss of 0.7 acres of native soils. Impacts to geology and soils are expected to be negligible, regardless of water treatment plant site location. There are no mining activities in the area. Refer to Section 5.1.1.

Water Supply Pipeline

Geological resources, minerals, and soils that would be temporarily affected during construction of the water supply line are expected to total approximately 53 to 66 acres along the 10.9 to 13.6-mile-long alignment. Construction parallel to the UPRR ROW would result in approximately 53 acres of disturbance throughout the 40-foot-wide disturbance area. An alternative alignment that would parallel the UPRR ROW from the water treatment plant to the Ivanpah-Table Mountain Transmission Line corridor and would be within the Ivanpah-Table Mountain/ Ivanpah-Mead Transmission Line corridor to the plant site would result in approximately 66 acres of disturbance. Areas disturbed during construction would be restored in accordance with BLM's approved restoration plan. Potential impacts to mining operations would be greater if the water supply pipeline were to be constructed within the transmission line corridor than would result from the route that would parallel the UPRR from the water treatment plant to the Primm plant site. However, potential impacts to mining are not expected to be significant, regardless of route selection.

Transmission Lines

Potential impacts to geological resources, minerals, and soils are similar among transmission line alternatives A through D.

An alignment that would interconnect the Ivanpah Energy Center, Mead Substation, and Table Mountain Substation would require construction within approximately 54.1 to 56.6 corridor miles. Approximately 227 acres would be temporarily disturbed during construction, primarily for structure fabrication and erection and for conductor pulling and tensioning. Approximately 8.3 acres would be permanently required for new access roads and spur roads and an additional 18 acres would be temporarily required for laydown areas. Impacts to geology and soils that would result from construction and operation of the transmission lines would be negligible; however, the presence of lines and structures would preclude mining operations within the 100-foot-wide ROW and some areas adjacent to the ROW.

Construction of access roads (primarily spur roads) would result in greater impact to soils within the McCullough Range (Ivanpah-Mead circuit) and through Crystal Valley (Ivanpah-Table Mountain circuit) than other areas due to topographic relief. However, soil disturbance and temporary removal of vegetation within relatively flat terrain is likely to result in increased localized erosion.

Soils disturbance can be minimized, to the extent practicable, by using existing roads and trails that were created during installation of the Pahrump-Mead Transmission Line, the Reliant Bighorn-Arden Transmission Line, and other transmission lines. Structure-for-structure placement from the Table Mountain Substation to Eldorado Lake would

optimize use of existing spur roads and access roads that were recently created by Nevada Power Company as part of the Reliant Bighorn-Arden Transmission Line and the existing VEA Pahrump-Mead Transmission Line. Although no laydown areas have been identified, potential locations appear to be readily available within areas that have been previously cleared as a result of the Reliant Bighorn-Arden Transmission Line and Mead Substation. Other sites that would be available include the temporary laydown area at the Ivanpah Energy Center plant site and the Quality Earth Minerals mining site near Hidden Valley.

Impacts to Mining

Minerals

Leasable Minerals: There are no known sources of leasable minerals on lands that would be affected by construction or operation of the Primm Plant Site Alternative, although geological conditions are consistent with potential deposits of oil, gas, coal, potassium, and sodium in the vicinity of the project area.

Locatable Minerals: Data on file at the BLM indicate that several mines and mine claims are located in the vicinity of the project site, including transmission line alternatives. A listing of mining claims (as of September 2002) that could be affected by the project is provided in Table 5-25.

Ivanpah Energy Center

Construction and operation of the Ivanpah Energy Center at Primm would not impact mining at the plant site. Since the land is privately owned and industrial facilities are under construction, it is unlikely that the site would be used for mining purposes. Construction of the natural gas supply pipeline would cross six active mining claims.

Access Roads

Access to the plants site will be via existing access roads. New access roads are not required.

Water Treatment Plant

The proposed water treatment plant (regardless of site selected) would be on State of Nevada land. Data from the BLM indicate that there are no mining claims that would be affected by construction or operation of the facility, regardless of treatment plant site selected.

Water Supply Pipeline

Construction of a water supply pipeline that would parallel the UPRR from Jean to the plant site would cross approximately 3,000 linear feet of active mines. If the pipeline were to be co-located within the transmission line corridor, approximately 32,000 linear feet of active mining claims would be crossed. Impacts to mining are not expected to be significant. If mining operations would be impacted, adjustments in the route could be made to to minimize impacts.

Transmission Lines

Data from the BLM that were compiled as of September 2002 indicate that approximately 40,000 linear feet of Transmission Line Alternatives C and E cross 74 active mining claims, as discussed in Section 5.1.1. Thirty-four mining claims are located along a segment of the transmission line corridor east of I-15 to the base of the McCullough Range; 40 claims are located along the segment west of I-15 to the Table Mountain Substation. Neither Alternative C nor Alternative E would cross potential oil or gas deposits in Eldorado Valley.

Table 5-25 Mining Claims That Could Be Affected by Development of the Primm Plant Site Alternative

LOCATION	AFFECTED BY	ALIQUOT PART	CLAIM NAME	CLAIMANT	Count Affected
T24S, R58E, SECT.34	TMS 10	SE	JEAN 1	PALMER PAMELA G	1
T24S, R58E, SECT.34	TMS 10	SE	JEAN 2	PALMER PAMELA G	2
T24S, R58E, SECT.34	TMS 10	SE	JEAN 3	PALMER PAMELA G	3
T24S, R58E, SECT.34	TMS 10	SE	JEAN 4	PALMER PAMELA G	4
T24S, R58E, SECT.34	TMS 10	SE	JEAN 5	PALMER PAMELA G	5
T24S, R58E, SECT.34	TMS 10	SE	JEAN 6	PALMER PAMELA G	6
T24S, R58E, SECT.34	TMS 10	SE	JEAN 7	PALMER PAMELA G	7
T24S, R58E, SECT.34	TMS 10	SE	JEAN 8	PALMER PAMELA G	8
T25S, R58E, SECT.01	10 20 30	SW	JEAN 49	PALMER PAMELA G	4
T25S, R58E, SECT.01	10 20 30	SW	JEAN 50	PALMER PAMELA G	5
T25S, R58E, SECT.01	10 20 30	SW	JEAN 51	PALMER PAMELA G	6
T25S, R58E, SECT.01	10 20 30	SW	JEAN 52	PALMER PAMELA G	7
T25S, R58E, SECT.01	10 20 30	SW	JEAN 54	PALMER PAMELA G	8
T25S, R58E, SECT.01	10 20 30	SW	JEAN 55	PALMER PAMELA G	9
T25S, R58E, SECT.02	10	NW	JEAN 12	PALMER PAMELA G	10
T25S, R58E, SECT.02	10	NW	JEAN 13	PALMER PAMELA G	11
T25S, R58E, SECT.02	10	NW	JEAN 14	PALMER PAMELA G	12
T25S, R58E, SECT.02	10	NW	JEAN 15	PALMER PAMELA G	13
T25S, R58E, SECT.02	10	NE NW	JEAN 16	PALMER PAMELA G	14
T25S, R58E, SECT.02	10	NE	JEAN 17	PALMER PAMELA G	15
T25S, R58E, SECT.02	10	NE	JEAN 18	PALMER PAMELA G	16
T25S, R58E, SECT.02	10	NE	JEAN 19	PALMER PAMELA G	17
T25S, R58E, SECT.02	10	NE	JEAN 20	PALMER PAMELA G	18
T25S, R58E, SECT.02	10	NE	JEAN 21	PALMER PAMELA G	19
T25S, R58E, SECT.02	10	NW	JEAN 27	PALMER PAMELA G	20
T25S, R58E, SECT.02	10	NW	JEAN 28	PALMER PAMELA G	21
T25S, R58E, SECT.02	10	NW	JEAN 29	PALMER PAMELA G	22
T25S, R58E, SECT.02	10	NW	JEAN 30	PALMER PAMELA G	23
T25S, R58E, SECT.02	10	NE	JEAN 31	PALMER PAMELA G	24
T25S, R58E, SECT.02	10	NE	JEAN 32	PALMER PAMELA G	25
T25S, R58E, SECT.02	10	NE	JEAN 33	PALMER PAMELA G	26
T25S, R58E, SECT.02	10	NE	JEAN 34	PALMER PAMELA G	27
T25S, R58E, SECT.02	10	SE	JEAN 45	PALMER PAMELA G	28
T25S, R58E, SECT.02	10	SE	JEAN 46	PALMER PAMELA G	29
T25S, R58E, SECT.02	10	SE	JEAN 47	PALMER PAMELA G	30
T25S, R58E, SECT.02	10	SE	JEAN 48	PALMER PAMELA G	31
T25S, R58E, SECT.02	10	SE	JEAN 53	PALMER PAMELA G	32
T25S, R59E, SECT.23	WL	SW	BARON ASSOC # 2	BARON MINING CORP	4
T25S, R59E, SECT.23	WL	SE	BARON ASSOC # 3	BARON MINING CORP	5
T25S, R59E, SECT.23	WL	NE	BARON ASSOC # 5	BARON MINING CORP	6
T25S, R59E, SECT.26	WL	NW	BARON ASSOC # 7	BARON MINING CORP	7
T25S, R59E, SECT.26	50 WL	SW	BARON ASSOC # 9	BARON MINING CORP	8

LOCATION	AFFECTED BY	ALIQUOT PART	CLAIM NAME	CLAIMANT	Count Affected
T25S, R59E, SECT.27	50 WL	SE	BARON ASSOC # 8	BARON MINING CORP	9
T25S, R59E, SECT.35	50 WL	NW	BARON ASSOC # 10	BARON MINING CORP	10
T25S, R60E, SECT.33	60	NE	GRANT 30	BARHAM R C	1
T25S, R60E, SECT.33	15 60	SE	GRANT #1	DAKOTA WEST INC	2
T25S, R60E, SECT.33	60	NE	G BERNADOT FLP #8	BERNADOT BRAD	3
T25S, R60E, SECT.33	15 60	SE	G BERNADOT FLP #9	BERNADOT GEORGE	4
T25S, R60E, SECT.33	60	SW	G BERNADOT FLP #10	BERNADOT GEORGE	5
T25S, R60E, SECT.34	15 60	SW	GRANT #2	DAKOTA WEST INC	6
T25S, R60E, SECT.34	15 60	SW	GRANT #3	DAKOTA WEST INC	7
T25S, R60E, SECT.34	60	NE	GRANT #13	DAKOTA WEST INC	8
T25S, R60E, SECT.34	60	NE	GRANT #14	DAKOTA WEST INC	9
T25S, R60E, SECT.34	60	NW	GRANT #15	DAKOTA WEST INC	10
T25S, R60E, SECT.34	60	NW	GRANT #16	DAKOTA WEST INC	11
T25S, R61E, SECT.20	60	NE	EL #24	RILITE AGGREGATE CO	1
T25S, R61E, SECT.21	60	NW	EL #25	RILITE AGGREGATE CO	2
T25S, R61E, SECT.21	60	NW	EL #26	RILITE AGGREGATE CO	3
T25S, R61E, SECT.21	60	NW	EL #27	RILITE AGGREGATE CO	4
T25S, R61E, SECT.21	60	NE	EL #30	RILITE AGGREGATE CO	5
T25S, R61E, SECT.21	60	NE	EL #31	RILITE AGGREGATE CO	6
T25S, R61E, SECT.21	60	NE	EL #32	RILITE AGGREGATE CO	7
T25S, R61E, SECT.21	60	NE	EL #33	RILITE AGGREGATE CO	8
T25S, R61E, SECT.21	60	NW	EL #36	RILITE AGGREGATE CO	9
T25S, R61E, SECT.21	60	NE SE	EL #40	RILITE AGGREGATE CO	10
T25S, R61E, SECT.21	60	NE SE	EL #41	RILITE AGGREGATE CO	11
T25S, R61E, SECT.22	60	NW	EL #33	RILITE AGGREGATE CO	12
T25S, R61E, SECT.22	60	SW	EL #41	RILITE AGGREGATE CO	13
T26S, R59E, SECT.01	50 WL	NE	GG 1	CALLAHAN EUGENE	1
T26S, R59E, SECT.01	50	NW	GG 2	CALLAHAN EUGENE	2
T26S, R59E, SECT.12	WL	SW	GG 9	CALLAHAN EUGENE	3
T26S, R59E, SECT.13	15 25 WL	SW	G3-55	GOLD RIVER MING CO	4
T26S, R59E, SECT.13	25 WL	NW	G 3	GOLD RIVER MING CO	5
T26S, R59E, SECT.13	15 25 WL	SW	PATTI ANN & B&L 3	HALL LEONARD G	6
T26S, R60E, SECT.04	15	NE	GRANT #6	DAKOTA WEST INC	1
T26S, R60E, SECT.04	15	NE	GRANT #11	DAKOTA WEST INC	2
T26S, R60E, SECT.04	15 60	NW	GRANT #22	DAKOTA WEST INC	3
T26S, R60E, SECT.04	15	SW	GRANT #23	DAKOTA WEST INC	4
T26S, R60E, SECT.06	50 WL	NW	SIERRA #1	DAVIS BYRON	5
T26S, R60E, SECT.06	50 WL	NE	SIERRA #2	DAVIS BYRON	6
T26S, R60E, SECT.06	50	SW	SIERRA #3	DAVIS BYRON	7
T26S, R60E, SECT.06	50 WL	SE	SIERRA #4	DAVIS BYRON	8
T26S, R60E, SECT.07	25 WL	NW	SIERRA #5	DAVIS BYRON	9
T26S, R60E, SECT.07	15 25 WL	NE	SIERRA #6	DAVIS BYRON	10
T26S, R60E, SECT.07	15	SE	STAR #1	CLARKE MARILYNN	11
T26S, R60E, SECT.07	15	SE	STAR #2	ANDERSON FERN YVONNE	12
T26S, R60E, SECT.08	15 25	NW	STELLA #3	BRUNER DANNY	14

LOCATION	AFFECTED BY	ALIQUOT PART	CLAIM NAME	CLAIMANT	Count Affected
T26S, R60E, SECT.08	15 25	NW	STELLA #4	BRUNER DANNY	15
T26S, R60E, SECT.08	15	NE	STELLA #5	BRUNER DANNY	16
T26S, R60E, SECT.08	15	NE	STELLA #6	BRUNER DANNY	17
T27S, R59E, SECT.06	GL	SE	GOLD STREAK NEVADA 1	TUNGSTEN SPRINGS INV GRP LTD	1
T27S, R59E, SECT.06	GL	SE	GOLD STREAK NEVADA 2	TUNGSTEN SPRINGS INV GRP LTD	2
T27S, R59E, SECT.06	GL	SE	GOLD STREAK NEVADA 3	TUNGSTEN SPRINGS INV GRP LTD	3
T27S, R59E, SECT.06	GL	SE	GOLD STREAK NEVADA 4	TUNGSTEN SPRINGS INV GRP LTD	4
T27S, R59E, SECT.06	GL	SE	GOLD STREAK NEVADA 5	TUNGSTEN SPRINGS INV GRP LTD	5
T27S, R59E, SECT.06	GL	SE	GOLD STREAK NEVADA 6	TUNGSTEN SPRINGS INV GRP LTD	6

TMS – Proposed Table Mountain Substation
WL – Water Supply Pipeline
GL – Natural Gas Supply Supply Line
IEC – Ivanpah Energy Center

Although construction of the proposed transmission line (including the segment from the IEC facility to Table Mountain Substation) would cross active mining claims, impacts to mining operations are not anticipated. A mine, operated by Quality Earth Materials, is located in Hidden Valley and is the only large active mine that is known to be near the transmission line. Based on discussions with the mine owner/operator, mining operations would be a considerable distance from the proposed transmission line route and neither the mine near the transmission line is expected to impact the other facility (Finley, 2002). Furthermore, potential impacts to the mine, or other mines, could be minimized by modifications to structure locations. The extent of such modifications would be dependent upon engineering considerations and cost.

An additional 7 to 13 mining claims, totaling approximately 14,000 linear feet (Segment 15) to 16,000 linear feet (Segment 25) would be crossed by the new double-circuit transmission line from the Primm Plant Site to Segments 50/60 and 60/65. If construction of the transmission line were to affect mining operations along either Segment 15 or 25, such areas would be spanned or proposed structure locations would be modified, to the extent practicable. Other actions that could be taken include negotiations with mine operators to reach an equitable solution to the situation. Therefore, potential impacts to mining were not considered to be significant.

Salable Minerals: There are known salable minerals within the proposed project site (see Table 4-1), including transmission line routes. The availability of such resources could be affected by the proposed project.

5.2.2 GROUNDWATER AND SURFACE WATER

Summary of Impacts Related to Groundwater and Surface Water	
Significance Criteria: Reduction in groundwater levels or quality that would preclude the use of such resources by other entities in the Jean – Goodsprings area or would require deepening of existing wells to maintain flow. Degradation of water quality that would result in failure to meet drinking water standards. Loss of flow to area springs. Susceptibility to on-site or off-site flooding due to altered surface hydrology.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Negligible short-term impacts related to the use of water for dust control during construction. Negligible impacts related to plant operations because treated wastewater from the Southern Nevada Correctional Center would be the primary water source for plant operations.	Water requirements total approximately 50 acre-feet per year because the plant would operate using an air-cooled condenser and refrigerated air. Treated wastewater would be used as the primary water source for the plant. Water usage during construction would be in compliance with a Clark County Dust Control Permit.
Access Roads: None required.	Not applicable
Water Treatment Plant: Negligible short-term impacts related to the use of water for dust control during construction.	Water usage during construction would be in compliance with a Clark County Dust Control Permit.
Water Supply Pipeline: Negligible short-term impacts related to the use of water for dust control during construction.	Water usage during construction would be in compliance with a Clark County Dust Control Permit.
Transmission Line: Negligible short-term impacts related to the use of water for dust control during construction.	Water usage during construction would be in compliance with a Clark County Dust Control Permit.

Potential impacts associated with water resources could result from excessive draw-down of local aquifers. If such a condition were to occur, the cost of groundwater pumpage by area users could increase; in severe conditions, groundwater could become unavailable.

The project proponent has taken action to reduce water process requirements for facilities operations. The proposed Ivanpah Energy Center would utilize an air-cooled condenser, in a process referred to as dry cooling, to condense spent steam from the steam turbine so that it can be re-used. Dry cooling reduces plant water usage by 90 percent or more as compared to conventional wet cooling methods. The use of dry cycling, as proposed by the project proponent, reduces water usage from 3,000 acre-ft per year (afy) or more to about 300 afy. In order to further reduce water requirements at the proposed plant, inlet air to the gas turbines will be cooled using mechanical refrigeration rather than evaporative cooling. Refrigeration will increase inlet air density and thus increase turbine power output. The combination of dry cooling and refrigerated air will reduce water requirements at the Ivanpah Energy Center to 50 afy or less.

Potential impacts to water resources would be further reduced by the use of gray water from the Southern Nevada Correctional Center, near Jean. When fully operational, gray water flows from the correctional center are expected to meet or exceed all process water requirements for the plant. If gray water flows from the SNCC are interrupted or curtailed, water from an area well would be used. As stated in 5.1.2, the amount of water that would be used cannot be estimated; however, it is likely that it would not be significant.

Potential impacts to surface water hydrology could occur if facilities construction were to alter drainage patterns to an extent that substantial flooding would occur elsewhere. Other potential impacts include increased erosion and siltation of receiving streams and drainages and modifications to existing drainages that would affect sensitive species or habitat. Construction of the proposed facility, telecommunications line, access roads, water treatment plant, water supply pipeline, and transmission lines would not substantially affect drainage patterns in the project area. Furthermore, potential impacts associated with increased erosion and sediment transport of soils would be reduced to the extent practicable through appropriate storm water controls and revegetation of disturbed areas.

Primm Plant Site Alternative

Construction and operation of the proposed Ivanpah Energy Center (including the natural gas supply line) would result in negligible impacts to groundwater resources within the area. Due to the overall absence of surface waters, such resources would not be affected.

Pumpage from existing water wells is depleting water sources.

Questions regarding the amount and source of water required for construction.

Construction of the Ivanpah Energy Center (and other project elements) would require the use of water for dust control. Water sources that are typically used for such purposes are likely to include potable water that is available through area wells and through the Las Vegas water system. Given that water needs for construction are relatively short-term and likely to extend no more than four months for plant site preparation and the natural gas supply pipeline installation, water requirements are expected to represent a negligible impact to groundwater resources.

Ivanpah Energy Center will require approximately 50 acre-feet per year (afy) of water for facilities operation, an amount that represents approximately 2.3 percent of annual groundwater recharge within the Ivanpah Valley (Harrill *et al.*, 1988). Other users in Ivanpah Valley total less than 700 afy, which represents approximately 32 percent of the annual recharge rate.

The Ivanpah Energy Center would rely on gray water generated from Southern Nevada Correctional Center as the primary water source; an existing LVVWD well that produces high levels of total dissolved solids (not suitable for domestic use) is proposed for use by the project proponent as a back-up water source. Since gray water would be the primary water source, potential impacts to groundwater that would be associated with plant operations are considered to be negligible.

Groundwater resources in Sandy Valley would not be affected because all water sources and uses would be confined to the Ivanpah

Concerns regarding water application in Sandy Valley.

Valley. Furthermore, Diamond Generating has indicated that they have withdrawn their applications for groundwater withdrawals from Sandy Valley.

Drainage within the plant site is limited due to its location in a partially closed basin. Due to limited drainage area, flooding is not anticipated. Furthermore, the facility is several miles from proposed drainage facilities that are identified in Clark County Flood Control District's Master Plan, and drainage control modifications have been made by Reliant Energy.

Access Roads

An existing access road to the Reliant Bighorn facility would be used. New access roads would not be required.

Water Treatment Plant

Water requirements associated with the construction of the water treatment plant would be short-term and related to dust control. Potable water from area wells or the LVVWD is likely to be used; however, potential impacts to groundwater would be negligible.

Water Supply Pipeline

Water requirements associated with construction of the water supply pipeline would be short-term and related to dust control. Potable water from area wells or the LVVWD is likely to be used; however, potential impacts to groundwater would be negligible.

Transmission Lines

Water requirements associated with construction of transmission lines would be short-term and related to dust control. Potable water from area wells or the LVVWD is likely to be used; however, potential impacts to groundwater would be negligible.

Clean Water Act—Section 404 Permit

The project site, access roads, water supply pipeline, and transmission lines are located within Ivanpah Valley and Eldorado Valley which are closed basins. The U.S. Army Corps of Engineers (St. George Utah office) concurred that Jurisdictional Waters of the U.S. are not present along the transmission lines from Table Mountain Substation to Mead Substation (refer to Section 5.1.2). Similar concurrence was reached by the Reno, Nevada office for the Primm Plant Site and the area that would be crossed by the Ivanpah-Mead/Ivanpah-Table Mountain double-circuit transmission line. Refer to Section 5.1.2 for additional information.

5.2.3 Biological Resources

Summary of Impacts Related to Biological Resources	
Significance Criteria: Loss of a unique biological community. Impacts to Category A or B desert tortoise density areas. Reduction of a plant or animal community/population that would severely jeopardize the continued existence of such a plant or animal community/population. Introduction of noxious weeds to a presently uninfested area. Violation of the Endangered Species Act, the Bald Eagle Act, the Migratory Bird Treaty Act, or Nevada State Law. Substantial interference with the movement or nesting of migratory species.	
Summary of Impacts	**Mitigation Measures**
Plant Site: The plant site is industrial highly disturbed by construction activities related to the Bighorn Generating Facility, and relatively absent of biological resources. Construction of the natural gas supply pipeline would temporarily disturb 19.4 acres of habitat; approximately 0.5 acres of habitat would be taken for construction of a natural gas metering station. All impacts to vegetation and wildlife (including desert tortoise) would be negligible to moderate.	Revegetation of temporary use areas only would take place in accordance with BLM restoration plans. Noxious weed control. Mitigation to avoid a "take" of desert tortoise.
Access Roads: None required.	Not applicable.
Water Treatment Plant: Negligible long-term impacts to vegetation and wildlife from loss of 0.7 acres of habitat at the plant site.	Disturbance to habitat would be minimized to the extent practicable. Disturbed areas would be restored in accordance with BLM's approved restoration plan. Noxious weed control. Mitigation to avoid a "take" of desert tortoise.
Water Supply Pipeline: Temporary disturbance to 53 - 66 acres of habitat, west of the UPRR ROW which would result in temporary moderate impacts to vegetation and wildlife resources.	Revegetation would take place in accordance with BLM restoration plans. Noxious weed control. Mitigation to avoid a "take" of desert tortoise.
Transmission Line: Moderate temporary loss of habitat to as much as 245 acres during construction; permanent (life of the project) loss of 8.3 acres of habitat. Significant impacts to desert tortoise along the alignment west of I-15 (Category B habitat); moderate impacts to the species east of I-15 (Category C habitat). Moderate impacts to other species, including bighorn sheep.	Concentrations of sensitive plant species would be spanned, and existing access roads would be used to the extent practicable. Revegetation would take place in accordance with BLM restoration plans. Avoidance of construction within the McCullough Range during lambing season. Avoidance of helicopter overflights across McCullough Range uplands. Noxious weed control. Mitigation to avoid a "take" of desert tortoise.

Construction and operation of the Ivanpah Energy Center at the Primm Plant Site would result in permanent and temporary direct loss of habitat at the natural gas metering station site and along the pipeline, water supply pipeline, and

transmission line ROWs. Although restoration would be carried out in accordance with BLM stipulations (refer to Appendix E) the extent of impacts would persist for several years following Revegetation and site restoration actions. Restoration plans would likely include salvaging and replanting of all barrel, cottontop, and hedgehog cactus that would be impacted during construction. Yucca (including Joshua trees and Mojave yucca) and other cacti (including prickly pear and pencil) that are over one-foot tall that would be impacted also would be salvaged and replanted. Secondary impacts also may result from the introduction of noxious weeds and other undesirable species which adversely affect the health and continued viability of desert tortoise populations. The introduction of noxious weeds also could result in a displacement of native plant species.

Construction of all project components west of I-15 would significantly impact the desert tortoise. As stated in 5.1.3, lands west of the interstate are considered to be Category B density habitat for the species, those east of the interstate are considered to be Category C (low density). Approximately 0.8 acres of Category B density habitat would be permanently taken as a result of construction; approximately 26.5 acres of Category B density habitat would be temporarily used. Potential impacts and mitigation measures associated with construction at the Primm plant site would be similar to those of the Proposed Goodsprings Plant Site.

Project elements that are associated with Category B density desert tortoise habitat are summarized (in acres) as follows:

Acres of Category B Desert Tortoise Density Habitat

	Permanent	Temporary
Primm Plant Site	- 0 -	- 0 -
Natural Gas Supply Pipeline	- 0 -	- 0 -
Telecommunications Line	- 0 -	- 0 -
Plant Site Access Road	- 0 -	- 0 -
Water Supply Pipeline	- 0 -	- 0 -
Transmission Line Pole Site Work Areas[1]	- 0 -	22.5
Transmission Line Pulling & Tensioning[2]	- 0 -	3.0
Transmission Line Access Roads	- 0 -	- 0 -
Transmission Line Spur Roads	0.8	1.0
Total Category B Acres	0.8	26.5

[1] Approximately 49 structures, 20,000 ft^2 each.

[2] Approximately 5 Pulling & tensioning sites

Note: Natural gas supply pipeline and metering station and water supply pipeline are outside of Category B density habitat. Telecommunications line, north and south access roads, and Transmission line access roads are not needed.

Primm Plant Site Alternative

The Ivanpah Energy Center at Primm would be located on highly disturbed industrial land that is largely absent of vegetation and wildlife habitat. However, some additional clearing of private land may be needed to accommodate the plant facility.

Impacts to Vegetation Resources

Construction or operation of the Ivanpah Energy Center at the Primm Plant Site would minimally impact vegetation resources. Installation of the 3.2-mile-long natural gas supply pipeline would result in the temporary loss of approximately 19.4 acres of creosote bush-bursage habitat; installation of a gas metering station at the KRGT would result in the permanent loss of 0.5 acres of habitat. Although areas that would be temporarily disturbed would be revegetated in accordance with BLM requirements, it is likely that they would not return to their original (pre-construction) condition for at least five years. Restoration of habitat is typically based on 60 percent recovery of native vegetation.

Impacts to Wildlife Resources

Potential impacts to migratory bird species are not expected, due to lack of habitat. A 100- by 200-foot (0.46 acre) retention pond is planned to be constructed within the property boundary of the Ivanpah Energy Center. As discussed in Section 5.1.3, waters entering and retained within the pond would originate as runoff from the plant site as a result of precipitation. Long-term presence of water within the pond is not anticipated due to arid conditions, low humidity, and low rainfall conditions that are characteristic of southern Nevada. Furthermore, water that would be present within the pond during rare occasions would represent an unreliable water source for area wildlife when compared to water availability from landscaping and maintenance activities associated with area casinos in Primm. Although some avian species may be attracted to runoff waters within the retention pond, fencing would largely preclude access by other wildlife.

Threatened, Endangered, and Sensitive Species

Although construction on the plant site would not affect desert tortoise populations, due to existing tortoise fencing, installation of the natural gas metering station and the pipeline would be within Category C desert tortoise habitat, which would represent a moderate impact to the species. Mitigation measures that would be implemented to reduce potential impacts to the species would be consistent with those identified for construction at the Goodsprings Plant Site (refer to 5.1.3). BLM stipulations that are applicable to construction of the natural gas metering station and pipeline would be consistent with those for Category C density desert tortoise habitat.

Access Roads

An existing access road to the Reliant Bighorn facility would be used for the plant site. New access roads would not be required.

Water Treatment Plant

Installation of a water treatment facility near the SNCC would result in the permanent (life of the project) loss of 0.7

acres of habitat. Operation of the water treatment plant and the use of treated water at the Ivanpah Energy Center would reduce the flow of gray water to SNCC rapid infiltration basins, as discussed in 5.1.3.

Impacts to Vegetation Resources

Impacts to vegetation would be the same as those described for the water treatment plant in Section 5.1.3. The loss of approximately 0.7 acres of native habitat would represent a moderate impact to the vegetation community.

Impacts to Wildlife Resources

Although the availability of water within the RIBs is generally beneficial to avian species in the area when compared to other water sources in the Jean area such as, landscaping and lawn maintenance, it is inconsistent and of low quality. However, the reduction of gray water to the basins and related impacts to wildlife cannot be quantified.

The Ivanpah Energy Center would require approximately 25 percent of maximum flows from the SNCC. If the water treatment facility were required to process the total flows from SNCC, resultant excess flows of processed water would be discharged to the SNCC RIBs. Under such conditions, waters entering the RIBs would be of higher quality than those currently available. Higher quality discharges to the RIBs would likely result in beneficial impacts to wildlife.

Threatened, Endangered, and Sensitive Species

As stated in Section 5.1.3, the water treatment plant would be located within Category C desert tortoise habitat. Consequently, impacts to the species are expected to be negligible to moderate.

Water Supply Pipeline

Construction of the water supply pipeline would result in the temporary loss of approximately 53 to 66 acres of disturbed and undisturbed habitat along the 10.9 to 13.6- mile-long alignment.

Impacts to Vegetation Resources

The area crossed by the proposed water supply pipeline is entirely within Creosote Bush-White Bursage vegetation community. Although impacts to the community would be temporary, they can be quantified (in terms of acres) and, therefore, are considered to be moderate. Restoration efforts would be undertaken to reduce the severity of impacts and to facilitate revegetation of disturbed lands.

Impacts to Wildlife Resources

Potential impacts to avian and other wildlife species would be similar to those described for the water supply pipeline that would serve the Proposed Goodsprings Plant Site (refer to Section 5.1.3) and are expected to be negligible to moderate.

Threatened, Endangered, and Sensitive Species

Construction of the water supply pipeline from the vicinity of the SNCC to the Primm Plant Site that would parallel the east side of the UPRR would not affect rare endemic plant communities in the area. If construction were to be located within the same transmission line corridor as would be used for the Ivanpah-Table Mountain Transmission Line, two populations of *Penstemon albomarginatus* would be crossed which would represent

temporary impacts to approximately 20 acres of habitat. The temporary loss of approximately 20 acres of habitat would represent a moderate impact to the species, even though steps would be taken (as described in Section 5.1.3) to mitigate the severity of impacts.

Installation of the water supply pipe (regardless of alignment selected) would result in moderate impacts to the desert tortoise. Both potential water supply pipeline alignments are within Category C density habitat for the species which has low density of the species. However, construction of the line along the UPRR ROW and within the Ivanpah-Mead/Ivanpah-Table Mountain Transmission Line corridor is likely to result in higher potential impacts to the desert tortoise than those associated with construction of the water supply pipeline along the UPRR corridor. Impacts to desert tortoise habitat would be moderate, regardless of alignment selected. Measures that would be implemented to reduce the severity of impacts would be consistent with those identified for the water supply pipeline from the water treatment plant to the Proposed Goodsprings Plant Site (refer to Section 5.1.3), although stipulations for Class C density would be applicable.

Construction of the water supply pipeline within the Ivanpah-Mead/Ivanpah-Table Mountain Transmission Line Corridor would require crossing approximately 13,000 linear feet of crucial Gambel's quail habitat that would not be crossed by construction of the water supply pipeline parallel to the UPRR ROW. Temporary impacts to approximately 12 acres of crucial quail habitat and to the species in general would represent a moderate impact. The severity of impacts to the species could be ameliorated through construction scheduling to avoid the nesting season.

Transmission Lines

Transmission line interconnections to the Ivanpah Energy Center, Mead Substation, and Table Mountain Substation would result in the permanent loss of approximately 8.3 acres of habitat that would be largely attributable to access road and spur road construction. An additional 245 acres of habitat would be temporarily affected at for the fabrication and erection of structures, pulling and tensioning of conductor, spur roads, and materials laydown areas. Areas crossed and biological resources that would be impacted would be much the same as those that would be crossed and impacted for transmission lines associated with the Proposed Goodsprings Plant Site.

Impacts to Vegetation Resources

Due to its relative abundance, impacts to the Creosote Bush-White Bursage Community would be most extensive, regardless of alternative transmission route selected. Impacts to Desert Saltbush and Stabilized Dune communities, located in Eldorado Valley, would be similar, regardless of transmission line alternative selected, but less than those to the Creosote Bush-White Bursage Community. Construction through the McCullough Range would impact Mixed Scrub-Mixed Succulent Community and construction through Crystal Valley to Table Mountain Substation would impact Desert Saltbush and Blackbush communities. Saltcedar Community is only present in limited areas along Transmission Line Segment 120 (Alternatives A and C). Impacts to vegetation communities that could be

affected by transmission line construction, listed on Table 5-26, indicate that construction of Alternatives A or C would have less impact to the Creosote Bush – White Bursage Community that that of other alternatives. Conversely, construction of Alternatives B or D would result in less impact to Desert Saltbush or Stabilized Dune communities than that of Alternatives A or C. Potential impacts to other communities (Mixed Scrub – Mixed Succulent, Blackbush, and Saltcedar) would be similar among the alternatives.

Habitat losses would be minimized, to the extent practicable, by using existing roads and trails that were created during installation of the Pahrump-Mead Transmission Line, the Reliant Bighorn-Arden Transmission Line, and other transmission lines. Structure-for-structure placement from the Table Mountain Substation to Eldorado Lake would facilitate use of existing spur roads and access roads that were recently created by Nevada Power Company as part of the Reliant Bighorn-Arden Transmission Line and the existing VEA Pahrump-Mead Transmission Line. Although no laydown areas have been identified, potential locations appear to be readily available within areas that have been previously cleared as a result of the Reliant Bighorn-Arden Transmission Line and Mead Substation. Other sites that would be available include the temporary laydown area at the Ivanpah Energy Center plant site and the Quality Earth Minerals mining site near Hidden Valley. Areas required are expected to total approximately 18 acres. Temporary impacts attributed to construction would result in moderate impacts because areas would be revegetated and restored in accordance with BLM's restoration plans. However, it is likely that complete restoration of temporarily disturbed areas would not take place for several years following completion of the project. Restoration would be considered to be successful when native vegetation is returned to 60 percent of pre-construction condition.

Impacts to Wildlife Resources

Impacts that would be associated with construction of transmission lines that would be needed for the Primm Plant would be similar to those for the Proposed Goodsprings Plant Site. All transmission line structures would be designed to preclude electrocution of avian species. Moderate impacts are expected due to displacement of many species; potential impacts to avian species and bighorn sheep are not expected to be significant if appropriate mitigation measures are followed. (refer to Section 5.1.3).

Table 5-26 Relative Impacts to Vegetation Communities

	Alternative A		Alternative B		Alternative C		Alternative D	
Corridor Segments	15, 65, 90, 120, 140, 60, 50, 30, 10		15, 65, 90, 110, 130, 140, 60, 50, 30, 10		25, 60, 65, 90, 120, 140, 50, 30, 10		25, 60, 65, 90, 110, 130, 140, 50, 30, 10	
	Length (ft)*	Acres**	Length (ft)*	Acres**	Length (ft)*	Acres**	Length (ft)*	Acres**
Total Length (ft)*	293,700		292,100		282,500		280,900	
Creosote Bush-White Bursage	169,600	133	200,100	156	164,400	134	194,900	160
Mixed Scrub – Mixed Succulent	58,300	46	58,300	46	52,300	42	52,300	42
Blackbush	5,000	5	5,000	5	5,000	5	5,000	5
Desert Saltbush	34,800	28	20,200	16	34,800	28	20,200	16
Stabilized Dune	30,500	23	13,500	12	30,500	26	13,500	12
Saltcedar	500	0	0	0	0	0	0	0

*Corridor length in linear feet, Ivanpah-Mead Substation-Table Mountain Substation

**Calculated from an estimated total of 235 acres for structure sites, pulling and tensioning, spur roads, and access roads.

Threatened, Endangered, and Sensitive Species

Construction of transmission lines from the Primm Plant Site to Table Mountain Substation and Mead Substation would result in similar impacts to *Penstemon bicolor bicolor* and *P. albomarginatus* populations as would result from construction of transmission lines that would be associated with the Proposed Goodsprings Plant Site. However, construction of the Ivanpah-Table Mountain/Ivanpah-Mead transmission line segment to the Primm Plant Site would cross an additional 13,000 linear feet of *P. albomarginatus* habitat. Overall impacts to *Penstemon spp.* that would be related to construction of transmission lines to the Primm Plant Site would be moderate.

Construction of the Ivanpah-Mead Transmission Line through the McCullough Range would require crossing approximately 13,000 linear feet of crucial Gambel's Quail habitat as described in Section 5.1.3. An additional 13,000 linear feet of crucial Gambel's Quail habitat would be crossed to serve the Primm Plant Site. Although impacts to the species would be greater than those associated with the Proposed Goodsprings Plant Site, they would be moderate and mitigation measures would be as described in Section 5.1.3.

Potential impacts to desert tortoise populations are expected to be greater as a result of construction west of I-15 than would occur east of the highway or in Eldorado Valley. Segment 30 crosses the Desert Tortoise Translocation Area, which is known to have high densities of desert tortoise. Field investigations conducted during Spring 2002 noted 37 active desert tortoise burrows, 30 inactive desert tortoise burrows, and six kit fox burrows along the 27,900 linear foot segment. The area west of I-15 is within Category B habitat and construction and operation of transmission lines through the area would represent a significant impact to the species. Additional information regarding potential impacts and mitigation measures are addressed in Section 5.1.3.

Numbers of active and inactive desert tortoise burrows that are present along Segment 50 are considerably less than those west of Interstate 15. Four active and 23 inactive burrows were observed along Segment 50, from the vicinity of I-15 to the vicinity of Sheep Mountain, a distance of approximately 25,900 linear feet. Four kit fox dens also were observed along the segment.

Although additional field investigations are required to fully determine the density of desert tortoise and kit fox that would be along transmission line Segments 15 or 25 (from the proposed Primm Plant to Segments 50 and 60), they cross Category C habitat and their numbers and density are likely to be similar to those along Segments 50 and 60. The area is known to have relatively low density of desert tortoise (based on field investigations conducted during 2001 for the Reliant Bighorn-Arden Transmission Line), and is dominated by the Creosote Bush-White Bursage Vegetation Community, which is common to other areas west of the McCullough Range.

No active desert tortoise burrows were observed along the western portion of Segment 60 from the vicinity of Sheep Mountain to the base of the McCullough Range; however, 26 abandoned burrows, seven kit fox burrows, and one live tortoise were present near the eastern slope of the

range. One active and two inactive desert tortoise burrows were observed along the eastern portion of Segment 60, which crosses a broad valley that represents an extension of Eldorado Valley.

Relatively few desert tortoise burrows were observed along Segments 90, 110, 130, and 140, which total more than 20 linear miles. A cluster of five active burrows was noted near the western margin of Eldorado Valley and several inactive desert tortoise burrows and kit fox burrows were observed along Segment 130, east of Eldorado Dry Lake. Potential impacts that would be related to construction and operation of transmission lines east of I-15 are expected to be Moderate. Additional information regarding impacts and potential mitigation measures is provided in Section 5.1.3.

Construction of the new transmission line from the plant site to Mead Substation and the line to Table Mountain Substation would result in the installation of single-pole structures and conductor that can be used as perching locations for ravens that prey on young tortoise. However, nearly 100 percent of the alignment would parallel existing transmission lines where similar (i.e., single-pole structures), or better perching locations (i.e., lattice structures) are present. Therefore, the addition of new transmission lines is not likely to result in increased raven numbers (and consequential, predation on young tortoise) than that which is presently within the area.

Construction of the transmission line would impact populations of white-margined beard-tongue (*Penstemon albomarginatus*) that are present near the site of the proposed Ivanpah Airport. Based on field investigations carried out during the spring and early summer of 2001 (as previously referenced, the species was not observed during the 2002 field surveys), approximately 1.75 miles of the proposed transmission line corridor crosses one population. Construction through the area would result in the temporary loss of as many as 200 plants within a 3.5-acre area. A similar population of approximately 200 plants was observed east of Roach Lake during 2001 field investigations along the Reliant Bighorn-Arden Transmission Line corridor. Although the new Ivanpah-Mead/Ivanpah-Table Mountain corridor would be offset approximately 200 feet from the Bighorn-Arden Transmission Line corridor, it is likely that seed material for the species is present within Segment 25 (and to a lesser extent, along Segment 15) of the project corridor. Since the species was not observed during the 2002 field surveys, actual numbers of plants that could be affected by construction cannot be estimated.

Actual impacts to the species can be minimized by spanning areas of high plant densities and by maximizing use of existing (previously disturbed) permanent access roads and permanent spur roads that were created as part of construction of the Reliant Bighorn-Arden Transmission Line, the existing Pahrump-Mead Transmission Line, and other transmission lines.

Construction of the Ivanpah-Mead/ Ivanpah-Table Mountain Transmission line west of Roach Lake would cross approximately 13,000 linear feet of crucial Gambel's quail habitat. A similar area of crucial habitat would be crossed by the Ivanpah-Mead Transmission Line, through the McCullough Range. Impacts to the habitat could include temporary displacement of quail, disruption of

nesting, and nesting failure. Although impacts were considered to be moderate, their severity could be ameliorated by scheduling construction periods to avoid the nesting season. Construction of various project components could impact migratory birds and other avian species. Impacts to avian species could be ameliorated by scheduling land clearing activities to avoid the nesting season. Field investigations may be necessary prior to construction to determine the presence or absence of nesting birds.

Although no laydown areas have been identified, potential locations appear to be readily available within areas that have been previously cleared as a result of the Reliant Bighorn to Arden Transmission Line and Mead Substation. A site that is located on private land, southwest of the I-15/SR 161 interchange, was used by Nevada Power Company as a laydown area for the construction of the Reliant Bighorn-Arden Transmission Line is likely to be available for use for the Ivanpah Energy Center project. Other sites that would be available include the temporary laydown area at the Ivanpah Energy Center plant site and the Quality Earth Minerals mining site near Hidden Valley. Temporary impacts attributed to construction would result in negligible impacts to biological resources on public lands because they would be revegetated and restored in accordance with BLM's restoration plans. Laydown areas on private lands are fenced and largely absent of wildlife habitat.

Potential impacts to the banded gila monster, western chuckwalla would be the same as those described for the Proposed Goodsprings Plant Site.

The proposed transmission line (regardless of alternative) crosses the McCullough Range and an area that is known to provide habitat for desert bighorn sheep (*Ovis canadensis nelsoni*). The area that would be crossed is a migration route from the South McCullough Range to the North McCullough Range and the area north of the line crossing is frequently used for lambing. If construction were to be restricted to the spring through early-fall (April through October) the severity of potential impacts to lambing could be reduced. The use of helicopters for construction also should be restricted to avoid overflights north or south of the pass to avoid impacts to sheep on uplands north and south of the pass. Under such circumstances, impacts to the herd would not be significant.

Impacts to Bighorn Sheep.

Other Special Status Species that May Be Affected

The U.S. Fish and Wildlife Service and the BLM list an additional five Species of Concern that were not found during field investigations, but potentially could be in the project area. The Clark County Multiple Species Habitat Conservation Plan lists two additional species that may be present in the area. Potential impacts to such species would be similar to those discussed in Section 5.1.3.

Special Status Species that are Unlikely to be Affected

Five species of concern are known to occur in Clark County, but not likely to be affected by the project. Those species are addressed in Section 5.1.3.

Noxious Weeds

A weed abatement program would be instituted to prevent the spread of noxious weeds. The program and methods that would be carried out to prevent the spread of noxious weeds is address in Section 5.1.3.

5.2.4 Cultural Resources

Many of the archaeological sites within the area of potential effect could be affected by construction of the Primm Plant Site Alternative and associated transmission and water lines. Some archaeological sites could experience impacts ranging from minor disturbance to destruction of the site. Impacts (*i.e.,* artifact collection) during construction would be mitigated through data recovery as determined by BLM, in consultation with the Nevada State Historic Preservation Office.

In accordance with Section 106 of the National Historic Preservation Act (NHPA), adverse impacts to sites determined eligible for the National Register of Historic Places (NRHP) would be mitigated through development of a treatment plan, in accordance with the Programmatic Agreement (PA) prepared by the Bureau of Land Management (BLM) in consultation with the Western Area Power Administration (Western), and the Nevada State Historic Preservation Office (SHPO). To evaluate the importance of a cultural resource under the National Historic Preservation Act, certain criteria have been established, which are referred to as Criteria a, b, c, and d. For sites eligible under Criteria a-c, (NRHP 36 CFR 60.4), mitigation other than data recovery may be considered in the treatment plan. For sites determined eligible under Criterion d (information potential), data recovery based on site-specific plans would be the primary means of mitigation. Techniques could include detailed mapping, artifact collections, excavation, documentary research, or oral history interviews. Data recovery, an adverse impact, would culminate in analyses, report preparation, and the curation of collections and records in accordance with the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 CFR 44716-37) and *Treatment of Historic Properties: A Handbook* (ACHP, 1980). No further work would be done at sites determined as not eligible for the NRHP.

It is currently unknown how many archaeological sites exist in the project area. However, before any construction would be allowed, a Class III cultural resources survey would be conducted for the area of potential effect. Pursuant to the PA for the proposed project, BLM would consult with the SHPO to determine eligibility of any sites identified in the area of potential effect. For the purposes of this analysis, it may be assumed that by following NHPA Section 106 procedures and the PA would mitigate adverse impacts to cultural resources in the project area. Unavoidable impacts to sites that are eligible for nomination to the NRHP would be mitigated through the implementation of a treatment plan in accordance with the PA.

5.2.5 Paleontological Resources

Project personnel reviewed literature on the paleontology and geology of the project area using both published and unpublished reports and papers. A records review of all known fossil localities within one mile of the project boundary also was performed by Harry Reid Center and San Bernardino County Museum personnel. Although results from a review of records at the Harry Reid Center and the San Bernardino County Museum indicate that no significant fossil localities have been found within the project boundaries, or within a one-mile vicinity of the project area, unrecorded sites may be present. Therefore, field investigations will be

carried out prior to project construction to determine the presence and importance of sites that may be affected.

Paleontological resources are protected on public lands by federal legislation by the following legislation:

- Antiquities Act of 1906. The Act forbids the disturbance of any object of antiquity on federal lands without a federal permit. The Act also established sanctions for unauthorized appropriation of antiquities.

- National Environmental Policy Act of 1969. The Act requires that important natural aspects of the national heritage be considered in assessing the environmental conesquences of a proposed project.

- Archeological and Historic Preservation Act of 1974. The Act provides for the preservation of historical and archaeological data that may be lost as a result of federal projects or federal actions. It specifically requires a survey for, and protection or recovery of, objects or data of scientific significance that are threatened by construction activities.

- Federal Land Policy and Management Act of 1976. The Act requires that scientific values be addressed in the management of public lands and resources.

It is currently unknown how many paleontological sites exist in the project area; however, a Class III survey will be conducted prior to any construction activity to identify sites that may be affected by the project. Pursuant to the PA for the proposed project, BLM would determine the importance of sites that would be impacted and mitigation procedures that would be required.

5.2.6 Land Use and Zoning

Summary of Land Use/Zoning Impacts	
Significance Criteria: Significant impacts would result if zoning change requests to Clark County cannot be resolved.	
Summary of Impacts	**Mitigation Measures**
Plant Site: The plant would be located on industrial use land, a portion of which has been zoned for heavy industry (M-2). No impacts to zoning are anticipated.	Additional private industrial lands would require a zoning change. Waivers and variances will be required prior to construction.
Access Roads: None required.	Not applicable.
Water Treatment Plant: Permanent use of 0.7 acres of State of Nevada Land for the plant.	The plant could be removed and the lands could be returned to the state, following the life of the project.
Water Supply Pipeline: Temporary disturbance of 53 to 66 acres. The action would result in negligible impacts.	Most of the pipeline corridor would either parallel the UPRR ROW or be co-located within proposed transmission line corridors. Temporarily disturbed areas would be restored following BLM's restoration plan.
Transmission Lines: Approximately 245 acres of temporary disturbance and less than 8.3 acres of permanent disturbance. Transmission line construction and operation would result in negligible impacts.	Nearly all transmission line corridors would be within BLM-designated Utility Corridors. Temporary disturbance would be limited by maximizing use of existing access and spur roads and by using previously disturbed/cleared laydown areas. Areas that are temporarily disturbed will be restored in accordance with BLM's approved restoration plan.

Construction and operation of the Ivanpah Energy Center at the Primm Plant Site is likely to require zoning of additional lands for heavy industry (M-2) use. Construction at the site also will require waivers and variances for height requirements, landscaping, off-site development requirements, sound requirements, and setback requirements. However, impacts related to land use and zoning issues are not expected to be significant.

Primm Plant Site Alternative

Land use in Ivanpah Valley and Eldorado Valley is administered through the Clark County and the City of Boulder City. The BLM is responsible for land management issues under the guidance of the Federal Land Policy and Management Act.

The plant (at Primm) would be located on private land, a portion of which has been zoned for heavy industrial use (M-2). There are no schools, hospitals, retirement centers, day care centers or similar sensitive receptors in the vicinity of the proposed plant site. However, temporary housing for casino employees is approximately 1.5 miles to the west.

Zoning change to M2 (Industrial) – industrial should be confined to one area.

Height Requirements

If the Primm Plant Site were to be developed, Ivanpah Energy Center LP will request a variance/waver to deviate from Clark County Code, Title 30, Section 30.40.220.b (Standards Applicable to All Manufacturing and Industrial Districts). The variance would permit the construction and operation of turbine exhaust stacks that would be at a nominal height of 150 feet above land surface. The height requirement is needed to meet air quality protection requirements. The variance also would allow construction of a 92 foot high Heat Recovery Steam Generator exhaust stack, which is needed for efficient heat recovery and steam production and a 65-foot-high air-cooled condenser that would be used to eliminate the need for a water-cooled cooling tower.

Landscaping

A variance from landscaping requirements (Clark County Code, Title 30. Section 30.64 [Site Landscaping and Screening Requirements]) will be requested because the proposed plant location is in an area that would not be accessed by the general public. Required landscaping would serve little to no useful purpose but would require irrigation.

Off-site Development Requirements

A variance from off-site development requirements (Clark County Code Title 30, Section 30.52) would be requested. The variance request would be based on the premise that there are no public or private structures or properties that are adjacent to, or near the proposed facility that would be affected by plant construction or operation. Furthermore, the plant is not likely to affect property values of lands in the area or recreational areas in the vicinity of the plant.

Sound Requirements

Octave band noise limitation requirements that have been established by the county (Clark County Code, Title 30, Section 30.68.020 [Noise]) range from 31.5 to 8000 Hz. However, octave band noise estimates cannot be determined and a waver from that part of the county ordinance would be requested.

Based on empirical data, noise levels are not expected to approach 49 dBA limits set for the property boundary.

Land use impacts associated with the proposed natural gas supply line are expected to be negligible. The natural gas supply pipeline (Application Serial No: N-75471) would be installed between the existing Kern River Pipeline and the plant site, in an area that would be disturbed by plant construction. Installation of the pipeline is expected to result in temporary disturbance to a nominal area. Soils and vegetation disturbed as part of installation would be restored in compliance with BLM's approved restoration plan.

Access Roads

An existing access road to the Reliant Bighorn facility would be used. New access roads would not be required.

Water Treatment Plant

Construction of the water treatment facility would require use of 0.7 acres of State of Nevada land. A special use permit would be requested to construct the treatment plan on the RU-zoned land.

Water Supply Pipeline

The proposed water supply pipeline (Application Serial No. 75475) would extend from the water treatment plant to the plant site. Approximately 12,500 linear feet would be located parallel the UPRR ROW to the proposed Ivanpah-Table Mountain transmission line corridor where the pipeline would either turn to the east within the corridor or continue south along the UPRR ROW. If the line were to utilize the transmission line corridor, the pipeline length would total 13.6 linear miles; if it were to parallel the UPRR ROW to the plant site, it would total 10.9 linear miles.

Construction of the pipeline would require temporary disturbance within a 40-foot-wide area along the 10.9 to 13.6-mile-long corridor. The 53 to 66-acre area of temporary disturbance would be revegetated in accordance with BLM restoration plans, following construction.

Transmission Lines

Potential land use impacts associated with construction and operation of the proposed Ivanpah-Mead/Ivanpah-Table Mountain Transmission Line are similar among the four alternatives. Major differences associated with the alternatives are associated with lands crossed within the Eldorado Valley (Figure 5-3). Alternatives A and C would cross approximately 6,860 linear feet of designated recreation land, 36,400 linear feet of conservation land, and 39,640 linear feet of open space land. Alternatives B and D would cross approximately 20,400 linear feet of recreation land, 62,700 linear feet of conservation land, and 10,800 linear feet of open space land. Although linear distances of designated recreation use, conservation use, and open space lands differ between the alternatives, they are largely within designated utility corridors and/or within areas that have high concentrations of transmission lines. Therefore, impacts to land uses that would be attributed to construction of either alternative would be negligible to moderate.

Permanent and temporary land use impacts associated with construction of the alternatives would be similar. Approximately 350 single-pole single-circuit structures and 62 single-pole double-circuit structures would be required for construction of the new transmission line, which, in total, would permanently (life of the project) occupy less than 0.1 acre of land. An estimated 49 pulling and tensioning sites would be required (see Appendix H). Assuming that each site would occupy a 100 by 300 foot area (30,000 ft^2), 3.4 acres would be temporarily disturbed within the ROW and 30.3 acres would be temporarily disturbed outside of the ROW. A 100 by 200 foot area (20,000 ft^2) would be required within the ROW at each structure location, thus resulting in approximately 188.3 acres of temporary disturbance.

Requirements for spur roads are likely to be minimized through the use of numerous existing roads, although a three to four-mile segment through Crystal Pass to Table Mountain Substation is likely to require blading to facilitate access by heavy equipment. Blading also would be required through portions of the McCullough Range. A 5,000-foot-long access road also would be needed from the plant site north to existing transmission line access roads.

Most of the corridor that parallels the new Reliant Bighorn-Arden Transmission Line can be accessed by using permanent access roads and permanent spur roads established by Nevada Power Company and Los Angeles Department of Water and Power. Similar access roads are available along portions of the line that parallels the Pahrump to Mead Transmission Line from Hidden Valley to Eldorado Valley and portions of the route that parallel other lines through Eldorado Valley. Although detailed engineering and a COM Plan is needed to accurately estimate lands required, spur roads would occupy approximately 9 acres; new access roads would occupy approximately 4 acres.

Although temporary laydown areas were not identified by VEA, existing (previously disturbed sites) would be used. Sites that are known to be available, or are likely to be available include the Ivanpah Energy Center temporary laydown area, a laydown site located at the SR 161/I-15 interchange that was recently used by Nevada Power Company for construction of the Reliant Bighorn-Arden Transmission Line, a mining site that is under development by Quality Earth Materials (near Hidden Valley), and several potential locations at Mead Substation. Use of such sites would reduce overall impacts to land uses.

5.2.7 Rangeland Management

Summary of Impacts Related to Rangeland Management	
Significance Criteria: Irreversible loss of a large portion of available rangeland that would make livestock production economically unviable.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Plant would be on private land. Installation of the natural gas supply pipeline would temporarily impact approximately 1.0 acre of grazing land.	Fences, gates, and livestock/tortoise guards will be replaced or repaired to their original (pre-construction) condition, as required by the landowner or land management agency, if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or land management agency. Open trenches would be fenced and covered. Access to water and feed would be maintained.
Access Road: Not applicable	None required.
Water Treatment Plant: No impact – not within BLM-managed rangeland.	None required.
Water Supply Pipeline: Temporary disturbance to 53 to 66 acres within Pasture 3.	Fences, gates, and livestock/tortoise guards will be replaced or repaired to their original (pre-construction) condition, as required by the landowner or land management agency, if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or land management agency. Open trenches would be fenced and covered. Access to water and feed would be maintained.
Transmission Lines: Temporary disturbance to grazing within Pastures 2 and 3.	Fences, gates, and livestock/tortoise guards will be replaced or repaired to their original (pre-construction) condition, as required by the landowner or land management agency, if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or land management agency. Open boreholes would be fenced and covered. Access to water and feed would be maintained.

Segments of Ivanpah-Mead and Ivanpah-Table Mountain transmission lines cross BLM Grazing Allotment lands that are east of I-15. Potential impacts associated with construction include the accidental release of livestock due to accidental damage to fencing or failure to close appropriate gates during transmission line or water supply pipeline construction, injury to livestock due to open boreholes and trenches, and

exclusion of livestock from water sources. Other impacts to livestock could result from the introduction of noxious weeds and other undesirable plant species.

Primm Plant Site Alternative

Plant site Alternative F is located on private land; therefore, there are no impacts to BLM-managed rangeland. The site is presently fenced to prevent livestock from entering the plant facility.

Potential impacts to livestock and rangeland improvements would be associated with construction of the natural gas pipeline. A portion of the natural gas pipeline east I-15 and the UPRR would traverse approximately 1,000 linear feet within Pasture 3 of the Jean Lake Grazing Allotment. During construction, access to water sources would be maintained and open ditches would be barricaded in such a way as to preclude livestock from falling into them. Damaged rangeland improvements, such as fences, gates, and water sources would be repaired immediately. Temporary fences and other appropriate measures approved by BLM would be used to control cattle movement. Detailed actions that would be taken to avoid impacts to grazing or to mitigate those impacts will be addressed in the COM Plan.

The proposed 100' x 200' metering station is not located within BLM-managed rangeland; therefore, there would be no impacts to livestock and rangeland improvements resulting from construction of the gas metering station.

Access Road

An existing asphalt-paved road located on private land would be used to access the plant site; therefore, potential impacts to BLM-managed rangeland are not expected.

Wastewater Treatment Plant

The proposed wastewater treatment plant and the wastewater interconnection pipeline (regardless of alternative selected) are not located within BLM-managed rangeland. Therefore, there would be no impacts to BLM-managed rangeland.

Water Supply Pipeline

The water supply pipeline would either parallel the eastern boundary of the UPRR ROW from the treatment plant to the Ivanpah Energy Center or parallel the UPRR and be co-located within the Ivanpah-Table Mountain/Ivanpah-Mead Transmission Line corridor. Construction along the UPRR to the plant site would result in temporary disturbance to approximately 53 acres of rangeland. Construction that would utilize transmission line corridors would temporarily disturb 66 acres. Potential impacts to grazing during construction within the grazing area would be avoided by replacement of fences and cattle guards, closure of open trenches, and maintaining livestock movement to feed and water sources. Impacts to grazing are expected to be negligible.

Transmission Lines

Approximately 111,600 to 112,800 linear feet of the Ivanpah-Mead/Ivanpah-Table Mountain Transmission Line corridor would cross Pastures 2 and 3. Potential short-term impacts to livestock and rangeland improvements would be associated with construction of the transmission lines; however, the extent of such impacts is expected to be negligible because fences and cattle guards would be maintained in their original condition, access to feed and water would be maintained, and boreholes and trenches would be covered during construction.

5.2.8 Recreation

Summary of Impacts Related to Recreation	
Significance Criteria: Actions that would preclude or greatly curtail recreational activities. Actions that would jeopardize the health and/or safety of individuals that are engaged in recreational activities.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Plant would be on private land. Installation of the natural gas supply pipeline would temporarily impact approximately 1.0 acre of land used for recreational purposes.	Coordinate construction of the natural gas pipeline with scheduled recreational activities in BLM-designated Special Recreation Areas.
Access Road: None required	Not applicable.
Wastewater Treatment Plant: The water treatment plant would not be located on recreational-use lands.	Not applicable.
Water Supply Pipeline: Construction along the UPRR ROW would result in a negligible impact to recreation. Construction within the transmission line corridor could result in moderate temporary impacts to 53 to 66 acres of recreational use acres during construction.	Coordinate construction of the water supply pipeline with scheduled recreational activities in BLM-designated Special Recreation Areas.
Transmission Lines: Construction would cross 83,000 to 90,000 linear feet of BLM-designated Special Recreation Areas, resulting in moderate temporary impacts. Construction in the Eldorado Valley would result in similar impacts to City of Boulder City recreation-use areas.	Coordinate construction of the transmission line with scheduled recreational activities in BLM-designated Special Recreation Areas. Schedule construction during months that will not conflict with the Bighorn Sheep hunting season. Coordinate construction of the transmission line in Eldorado Valley with scheduled activities through the City of Boulder City.

Construction of the Ivanpah-Mead and the Ivanpah-Table Mountain transmission line and the water supply pipeline could result in temporary impacts to off-road racing events and casual users within the Jean/Roach Dry Lakes Special Recreation Management Area and elsewhere. Although the extent of impacts could include displacement of activities during construction, the severity of impacts could be reduced through appropriate scheduling, flagging of construction work sites, and restoration of disturbed areas. Transmission line construction through the McCullough Range also could temporarily displace bighorn sheep and reduce hunting success, if construction were to take place coincidental to the hunting season. Additional temporary impacts to birding and wildlife observation and study would result from increased dust, noise, and human activity during construction.

Potential benefits that are often attributed to the creation of new roads and increased public access would be minimal because existing roads would be used to the maximum extent and new road construction that is typically associated

with new transmission lines would largely consist of overland trails.

Primm Plant Site Alternative

The plant site is located on private land and not used for recreational activities; therefore, no impacts to recreation associated with the construction or operation of the plant facility are expected. Potential impacts to recreational resources could occur during the construction of the proposed natural gas pipeline. Approximately 1,000 linear feet crosses the BLM- designated Jean/Roach Dry Lakes Special Recreation Management Area. Generally, organized recreational events, such as off-road racing, are restricted to existing trails and roads and primarily occur east of the UPRR; therefore impacts to recreational resources would be temporary and short-term. During construction, potential impacts can be mitigated by coordinating organized recreational events with the construction schedule.

Access Roads

The existing access road to the plant site is located on land that is not used for recreational activities. Impacts to recreation resources resulting from use of the access road to the plant site are not anticipated.

Water Treatment Plant

The proposed water treatment plant (regardless of option selected) is not located within areas that are used for recreation. Therefore, impacts to recreation resources are not anticipated.

Water Supply Pipeline

The Jean Sport Aviation Center is located to the west of the SNCC wastewater treatment plant; however, potential impacts resulting from construction of the water supply line to sport aviation activities are not anticipated. Although the pipeline would be located within BLM's Jean /Roach Dry Lakes Special Recreation Management Area, organized recreational activities, such as off-road competitive events, do not occur within the area. Race courses for off-road competitive events are restricted to existing and designated trails that are primarily east of the UPRR; therefore, potential impacts to off-road competitive events during construction are not expected.

Potential impacts to recreational activities that occur on the Roach Dry Lake, such as parasailing, ultralight gliding, remote model plane flying, and rocket launching could occur during construction of the water supply line. These recreational activities typically take place during the weekends and are not expected to conflict with construction schedules; however, negligible impacts could result when recreation activities occur on weekdays. Construction areas would be flagged and marked to avoid conflicts with recreational activities occurring in the area.

Construction of the 13.6-mile-long water supply pipeline that would be partially co-located with the Ivanpah-Mead/Ivanpah-Table Mountain Transmission Lines would cross the BLM-designated recreational area. Construction through the area could result in temporary moderate impacts to recreational activities, if construction were to coincide with special events. Potential impacts could be mitigated by scheduling

construction to avoid periods of event activities.

Transmission Lines

Potential impacts to recreation resources associated with the construction and operation of transmission line for the Primm Plant Site would be similar to potential impacts related to that of the Goodsprings Plant Site. Portions of the transmission line alternatives cross the Ivanpah Valley within BLM-designated utility corridors, where organized recreational activities, such as off-road competitive racing events, occur in the Jean/Roach Dry Lakes Special Recreation Management Area. Approximately 83,000 to 90,000 linear feet (Ivanpah-Mead/Ivanpah-Table Mountain circuits) pass through the Jean/Roach Dry Lakes Special Recreation Management Area.

Impacts related to the presence of the alternative transmission line routes are not anticipated, primarily because the alignment used by any of the alternatives would parallel existing transmission lines and because structures would, to the extent practicable, be located adjacent to existing structures. Potential impacts to racing events can be mitigated by scheduling construction within the Jean Lake/Roach Lake area during times that will not conflict with race events.

The portion of the transmission line route that would interconnect with the Table Mountain Substation west of I-15 passes through an area used for airborne activities such as hang gliding, parasailing, and skydiving. The proposed transmission line route would parallel existing transmission lines; therefore, potential impacts to airborne recreation are not anticipated.

Potential impacts associated with the portion of transmission line alternatives that pass through the McCullough Range and Eldorado Valley would be the same as with the Goodsprings Plant Site. Scheduling construction that will not conflict with the hunting season can mitigate short-term impacts associated with Bighorn Sheep hunting. Likewise, short-term impacts associated with construction of the transmission line through the Eldorado Valley can be mitigated by coordinating construction activities with scheduled organized events through the City of Boulder City.

5.2.9 Transportation

Summary of Transportation Impacts	
Significance Criteria: A decrease of roadway or intersection traffic below level of service C. Adverse effects on public safety that would be likely to result hazardous conditions, as defined by good engineering practices. Creation of permanent impediments to traffic.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Access to the plant site would be from I-15 and an existing paved road to the Bighorn facility. Traffic-related impacts are not anticipated.	Scheduling of heavy loads to avoid periods of high traffic volumes at the I-15/Primm Interchange.
Access Roads: Not applicable.	None required.
Water Treatment Plant: Construction of the water treatment plant would require movement of heavy equipment on I-15 and local roads that also serve area businesses and the SNCC. However, impacts to transportation would be short-term and negligible.	Potential impacts to transportation could be minimized by scheduling of major plant components to periods when traffic related to area businesses is low. Pilot cars should be used, when appropriate.
Water Supply Pipeline: No impacts to transportation.	None required.
Transmission Lines: Negligible impacts to transportation.	None required.

Construction activities associated with the Proposed project would result in increased traffic. The movement of equipment and workers could result in temporary traffic safety issues and decreased levels of service at major intersections. The extent of such impacts, which would be largely related to plant and transmission line construction, can be mitigated by scheduling of heavy loads, and the use of pilot cars. Therefore, impacts to transportation would not be significant.

Primm Plant Site Alternative

Potential impacts to traffic along I-15 and local roads in Primm are expected to be minimal. Movement of heavy loads would be scheduled to avoid periods of relatively high traffic volumes and pilot cars would be used, when appropriate. Transportation requirements for construction of the generating facility would extend over a 22-month period. The average number of trips during the period is expected to total approximately 30; during peak periods (12^{th} through 17^{th} months of plant construction), daily trips would total approximately 65. Traffic flow levels at area intersections are not expected to decrease from their current "A" levels during plant construction or plant operations (Table 5-27). Approximately 20 workers would staff the facility during normal operations, resulting in a negligible impact to area traffic levels.

Table 5-27 Anticipated Construction Vehicle Levels

Vehicle Type	Average Daily Trips	Peak Daily Trips
Construction Personnel	150	275
Delivery Trucks	5	10
Heavy Vehicles and Trucks	5	15
Total	160	300

Construction equipment and personnel to the Primm Plant Site Alternative will access the area from the I-15/Primm interchange to Wells Road and the main entrance to the Reliant Bighorn Generating Facility. Wells Road and the road to the plant site are asphalt-paved and an at-grade crossing of the UPRR is gated. A permanent grade-separated crossing is planned by Reliant Energy; however, the at-grade crossing would be maintained for movement of heavy loads.

Traffic surveys that were conducted by Clark County and traffic flow projections performed by URS (2001) indicate that peak traffic conditions occur during Sunday afternoons. Approximately 450 vehicles enter the northbound entrance ramp to I-15 during peak hour (assumed to be during the late-afternoon) conditions and 530 vehicles enter the southbound ramp during peak hour (assumed to be during the morning) conditions. During peak periods, construction of the Ivanpah Energy Center could reach a maximum of 420 vehicles per hour, which would represent worst-case conditions used in this analysis. Under such circumstances, traffic levels would range from 870 to 950 vehicles per hour. Peak construction traffic would likely occur during the 10th through 13th month of plant construction. During normal plant operational conditions, a maximum average of 46 vehicle trips would be expected to occur daily. Based on traffic data, construction and operational traffic at the I-15/Primm interchange would result in moderate to negligible impacts, respectively.

Construction of the Ivanpah Energy Center at Primm would not require new access roads. The existing access road to the Reliant Bighorn Facility would be used.

Water Treatment Plant

Potential impacts to traffic along I-15 and local roads would be short-term and limited to the period of construction as described in Section 5.1.9. Impacts to traffic are expected to be negligible during construction and during operations.

Water Supply Pipeline

Potential impacts to highway, railroad, and aviation transportation resources that would be associated with construction of the water supply pipeline are not anticipated. The water supply pipeline would be installed along the UPRR ROW and/or within transmission line corridors from the water treatment plant to the Primm Plant Site.

Transmission Lines

Transmission line crossings (I-15 and U.S. 95) would be accomplished using guard poles to support conductors during line stringing as discussed in Section 5.1.9. The transport of structures and heavy equipment could result in a short-term increase of traffic along some local roads. The transmission line route north of the proposed Ivanpah Airport would parallel the Reliant Bighorn-Arden Transmission Line, which has been oriented in a manner to avoid potential conflicts with either the Jean Airport or the proposed Ivanpah Airport. Structure and conductor heights would be below FAA 1:100 aircraft slope clearance requirements for Jean Airport or for the proposed Ivanpah Airport. Therefore, impacts associated with the proposed transmission line are expected to be negligible.

5.2.10 Hazardous Materials

Summary of Impacts Related to Hazardous Materials	
Significance Criteria: Actions that would result in health and safety impacts to area residents. Violation of federal, state, or local regulations regarding handling, transport, or containment of hazardous materials as defined under CERCLA or SARA.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Potential impacts during construction or operation are not anticipated.	Use of aqueous ammonia, rather than anhydrous ammonia. Compliance with federal, state, and Clark County containment and spill prevention requirements.
Access Roads: Not applicable.	None required.
Water Treatment Plant: Potential impacts during construction or operation are not anticipated.	Compliance with federal, state, and Clark County containment and spill prevention requirements. Servicing of vehicles and equipment on public lands would be minimized, to the extent practicable.
Water Supply Pipeline: Potential impacts during construction or operation are not anticipated.	Servicing of vehicles and equipment on public lands would be minimized, to the extent practicable.
Transmission Lines: Potential impacts during construction or operation are not anticipated.	Servicing of vehicles and equipment on public lands would be minimized, to the extent practicable.

Potential impacts related to hazardous materials include releases of fuels, lubricants, and coolants due to vehicle/heavy equipment accidents and during maintenance/refueling activities. Potential harmful effects of hazardous materials associated with plant operations have been reduced by a decision of the project proponent to use aqueous ammonia, rather than anhydrous ammonia, for air emissions reduction. Spill prevention, containment, and cleanup would be in accordance with requirements of OSHA, CERCLA, SARA, and EPA guidelines, thus, potential impacts associated with hazardous materials would not be significant.

Primm Plant Site Alternative

Non-hazardous and hazardous wastes would be generated as part of construction and operation of the IEC generating facility, natural gas supply line, water line, and transmission lines. All wastes generated from such activities would be transported off-site for disposal at approved disposal sites or transported for recycling through approved vendors and suppliers. Burning of trash would not be permitted. Therefore, impacts associated with the generation, storage, or removal of such wastes are not anticipated.

Ammonia would not be used as a refrigerant. Aqueous ammonia (at concentrations of less than 20 percent) would be used for air emissions reduction; anhydrous ammonia would not be stored within, or used at the facility. Therefore, potential impacts associated with the use or storage of ammonia are not anticipated.

Hazards of ammonia storage and ammonia use for refrigerant as well as monitoring for leaks.

Construction and operation of the IEC generating facility and related facilities will require the use and removal of hazardous and non-hazardous wastes. Hazardous materials are defined in Section 5.1.10 of this document. The release of any hazardous material or waste will be immediately reported to the National Response Center consistent with the National Contingency Plan. (40 CFR 300). The BLM will be concurrently notified. No impacts to soils or groundwater will occur as a result of the proposed project.

Waste disposal and transport from the plant site.

Non-hazardous waste materials, solid hazardous materials, and liquid hazardous materials that would be generated during construction of the IEC generating facility are summarized in Table 5-8, Section 5.1.10.

The IEC generating facility (classified as a small generator of hazardous materials) will operate under a set of Procedures and Programs, which deal with fires and other emergencies. The Procedures and Programs will address/include: fire safety, fire response program, emergency response procedures, and related actions. Estimated response time to the plant site is in excess of 30 minutes.

Safety measures at the plant site in the event of a fire or hazardous spill emergency.

Length of emergency response time for Clark County Fire Department to respond to a fire or hazardous material spill.

Waste lubricating materials will be periodically generated during the operation and maintenance of the generating units. These materials will be collected and stored in appropriately designed and labeled storage containers. Waste lubricants will be recycled by an approved contractor in compliance with applicable regulations. Similar treatment will be afforded the sludge collected at the oil-water separator.

Herbicides, pesticides, and algaecides will be stored inside a suitable structure. The immediate area around these chemicals will be appropriately labeled. The storage of such chemicals onsite will be minimized. In the event that an amount of any of these chemicals must be disposed of, such disposal will be conducted in compliance with all local, state, and federal disposal and handling regulations.

Unused batteries will be stored in an appropriate location, inside a storage structure on the property. Used batteries will be stored, prior to disposal, in an appropriately labeled and protected location. Spent batteries will be sent to and recycled by, an approved recycling facility.

Combustion exhaust catalyst will be used as part of the air quality control systems associated with the generating units. These catalyst materials, which will consist of vanadium and other metals, are expected to last approximately 5 years. Spend catalyst will be recycled by the manufacturer.

Solvents may be used for parts cleaning and other maintenance activities. The use of solvents onsite will be minimized. All solvents will be stored in labeled areas in appropriate containers. Spent solvent sill be collected and recycled by an appropriately licensed contractor.

Media-blasting (sand-blasting) will be used for cleaning and descaling of various parts and components from time-to-time. The spent blasting media may be a hazardous waste, and will be treated as such. The spent media will be collected and recycled by a licensed contractor.

Anti-freeze will be used and replaced in certain machinery such as the diesel fire pump engine. Waste anti-freeze will be disposed of at a licensed recycler.

Although not a waste, ammonia will be used in the selective catalytic reduction process to reduce nitrogen oxides compounds from the exhaust of the fuel combustion in the generating units. It is planned that aqueous ammonia at less than 20 percent concentration will be stored in five 20,000-gallon tanks onsite prior to use. These tanks will be designed with secondary containment, and will be structurally protected to prevent accidental releases. No waste ammonia is expected to be generated during the operation of the generating units.

Accidental spills will be handled in accordance with applicable laws and plant operations procedures consistent with regulatory requirements (refer to Section 5.1.10).

Table 5-9 (refer to Section 5.1.10) lists annual volumes of non-hazardous and hazardous wastes that will be generated during operation of the generating facility.

5.2.11 Visual Resources

Summary of Visual Impacts and Mitigation	
Significance Criteria: Conflict with VRM objectives as stated in the Resource Management Plan Substantial visual impacts at sensitive receptors of a large number of area residents.	
Summary of Impacts	**Mitigation Measures**
Plant Site: KOP #8: weak contrast, negligible impact KOP #9: weak contrast, negligible impact	KOP #8 and #9: • Use of colors on plant components that blend with the surrounding desert landscape. • Use of directional lighting and shielding devices to reduce glare; limited lighting use and placement of lighting only in areas where needed or required by regulation. • Contouring of disturbed surface areas following construction of the plant facility to closely match the surrounding area.
Wastewater Treatment Plant: Negligible visual impact to viewers from area businesses.	Use of colors on plant components that blend with the surrounding desert landscape. Use of directional lighting and shielding devices to reduce glare; limited lighting and placement of lighting.
Water Supply Pipeline: - Negligible	Revegetation of temporarily disturbed areas with native plant species according to the BLM-approved Restoration Plan along the ROW.
Transmission Lines: KOP #3 Substation *(not a component of this project)*: strong contrast, significant impact KOP #3 Transmission line: weak contrast, negligible impact KOP #4 Substation *(not a component of this project)*: strong contrast, significant impact KOP #4: Transmission line: weak contrast, negligible impact KOP #5a: weak contrast, negligible impact KOP #5b: weak contrast, negligible impact KOP #6: weak contrast, negligible impact KOP #7: weak contrast, negligible impact	KOP #5a, #5b, #6, and #7: • Use pole-for-pole configuration to the extent practicable. • Use nonspecular conductor • Use medium, gray-painted structures* • Use of materials and colors that blend with the surrounding landscape.
*Specifications for Gray-painted structures Company: Carboline Color #: 0729 (Medium Gray) Paint #: 8819 Top Coat #: 8809 (Acrylic Aliphatic Polyurethane)	

Construction and operation of the project will result in impacts to several view sheds. The severity of such impacts is largely dependent upon viewer sensitivity, viewer duration, the presence or absence of other features in the area, and the size, shape, and form of the object(s) being viewed. Although new transmission lines and other project components will result in visual impacts, mitigation measures would be taken that would reduce their severity to insignificant.

BLM VRM Classifications

As discussed in Section 4.11.2, according to BLM's *Las Vegas RMP*, the proposed project and alternatives would be located within two VRM Classes, Class II and Class III. The area of the Primm Plant Site is located within a VRM Class III Area (See Figure 4-8). Portions of the proposed transmission line associated with the Primm plant site that cross the McCullough Range and Crystal Pass are located within a VRM Class II area (See Figure 4-8).

VRM Evaluation Process

A visual contrast rating evaluation was conducted to determine the degree of contrast the Primm Plant Site would have on the affected landscapes. As described in the Goodsprings Plant Site alternative, the visual contrast evaluation process follows the guidelines described in the BLM's Visual Resource Contrast Rating, BLM Manual Handbook 8431-1 (refer to Section 5.1.11).

KOPs are determined based on critical viewpoints, typically along well-traveled routes, near sensitive receptors such as homes and communities, highway crossings, and by type and number of viewers. Five key observation points (KOPs) are associated with the Primm Plant Site and are described in Table 5-28. The location of each KOP is shown in Figure 5-4.

Table 5-28 Description of KOPs for the Primm Plant Site Alternative

KOP	KOP Description
KOP #3	View westbound on Sandy Valley Road at the Table Mountain Substation where the transmission lines would interconnect. KOP #3 was selected because of potential visual impacts associated with the substation and transmission lines to sensitive viewers and the duration of the view.
KOP #4	View eastbound on Sandy Valley Road at the Table Mountain Substation where the transmission lines would interconnect. KOP #4 was selected because of potential visual impacts associated with the substation and transmission lines to sensitive viewers.
KOP #5	View southbound on I-15 where the transmission line would cross the interstate. Two simulations were prepared for this KOP to compare the potential impacts associated with the two different structure colors (Coreten and gray-painted). KOP #5 was selected because the transmission line crosses the highway and the potential for visual impacts to a large number of viewers.
KOP #6	View northbound on U.S. 95 where the transmission line alternative would cross the highway just south of the dry lakebed. KOP #6 was selected because the transmission line crosses the highway and the potential for visual impacts to a large number of viewers.

KOP	KOP Description
KOP #7	View northbound on U.S. 95 where the transmission line alternative would cross the highway just north of the dry lakebed. KOP #7 was selected because the transmission line crosses the highway and the potential for visual impacts to a large number of viewers.
KOP #8	View of the proposed plant site for motorists traveling southbound on I-15 north of Primm. KOP #8 was selected because of the potential for visual impacts to a large number of viewers traveling south on I-15.
KOP #9	View of the proposed plant site for motorists traveling northbound on I-15 south of Primm. KOP #9 was selected because of the potential for visual impacts to a large number of viewers traveling north on I-15.

Visual Resource Contrast Rating Worksheets were completed for each of the five KOPs to assess the degree of contrast between the existing landscape and the landscape modified by the proposed project (See Appendix I). The analysis included a comparison of three basic features (landform/water, vegetation, and structures) and the basic elements (form, line, color, and texture) of the existing landscape and the modified landscape. The degree of contrast is determined by rating the elements of the existing landscape with the modified landscape according to criteria as described in Table 5-29 below.

Table 5-29 Criteria for the Degrees of Contrast

Degree of Contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

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Computer generated visual simulations depicting the proposed project on affected view sheds were prepared for the five KOPs in the contrast evaluation.

Contrast ratings were compared with the objectives outlined for the Visual Resource Management (VRM) class designated by the BLM RMP for the project area.

Following is a discussion of the visual impacts associated with each project component and the KOPs that were evaluated, and potential visual impacts not associated with a KOP. Visual contrast evaluations are located in Appendix I; visual simulations are located at the end of this section.

Primm Plant Site Alternative

Impacts Associated with KOP #8

The contrast evaluation (Appendix I) indicates that visual contrast associated with the view of the proposed plant site for motorists traveling southbound on I-15 would be "weak" resulting in a negligible impact (KOP #8, see Figure 5-15). Visual impacts would be encountered for some traveling distance; however, view duration would be brief and peripheral. From KOP #8, the plant facility would be noticeable, but would not dominate the view shed. The landscape has been previously modified with the presence of the newly constructed Reliant Bighorn Generating Facility. Additionally, modifications to the existing the landscape would be viewed from distances of approximately two to three miles. The severity of visual contrast decreases with distance. Use of colors on plant components that blend with the surrounding desert landscape would reduce the level of visual contrast. As motorists approach the Primm exit, the plant site would not be visible because existing manmade modifications (e.g. casinos, retail facilities) would dominate foreground views.

Visitors to local casinos and retail facilities would not experience visual impacts associated with the presence of the IEC plant. The new facility would be located directly east, or behind, the existing Reliant Bighorn Generating Facility. Additionally, views from the east side of Buffalo Bill's Casino Resort would be partially blocked by an existing roller coaster structure.

Lighting from the Ivanpah Energy Center would be designed to reduce visibility from I-15 and casinos on the east side of the interstate during nighttime hours. Use of directional lighting would shield some views from outside the plant. Also, limiting the number and intensity of lights to portions of the facility would reduce visual impacts associated with nighttime lighting of the plant facility.

Similar to the Reliant Bighorn Generating Facility, a condensation plume associated with operation of the Ivanpah Energy Center could be visible during the winter months. Meteorological conditions and plant operations would determine the size and height of the plume.

The proposed natural gas pipeline right-of-way west and east of I-15 would parallel a newly constructed natural gas pipeline servicing the Reliant Bighorn Generating Facility. Visual impacts related to construction of the proposed natural gas supply line and metering station are expected to be limited to

surface disturbance along the pipeline right-of-way in an area previously disturbed by the newly constructed pipeline. Surface disturbance would include a 50-foot-wide corridor in which vegetation would be either removed or disturbed as a result of pipe laying activities. Visual impacts resulting from removal of vegetation would be negligible to motorists traveling I-15 and the extent of the impact would attenuate over time as the site restoration/ revegetation is implemented.

Impacts Associated with KOP #9

Based on the contrast evaluation (Appendix I), the visual contrast associated with views of plant facility from I-15 traveling northbound (KOP #9, see Figure 5-16) would be "weak" resulting in a negligible impact. Visual contrast associated with KOP #9 would be similar to impacts discussed for KOP #8. The plant facility would be visible to motorists traveling northbound on I-15, but at a distance of two to three miles, the visual contrast would minimal, particularly in a landscape previously modified with the presence of an existing power generating facility. Also, motorists' views would be brief in duration.

As illustrated in Figure 5-15, the Ivanpah Energy Center is not visible from KOP #8. Due to the proposed facility's location, directly east (or behind), the existing Reliant Bighorn Generating Facility would shield views of the proposed project. However, motorist traveling northbound further south on I-15 could encounter views of the plant facility, but at a greater distance and with the existing Reliant Bighorn Generating Facility, visual contrast would be negligible.

Use of colors on plant components that blend with the surrounding desert landscape and other manmade features, as well as use of directional lighting during nighttime hours, would minimize the level of visual contrast for viewers from KOP #9.

Water Treatment Plant

As discussed in Section 5.1.11, the water treatment plant (regardless of specific plant location) would be visible from traffic along Las Vegas Boulevard, the access road to the SNCC, and some area businesses; however, the plant's location is within an area that presently includes the UPRR, several cellular telephone towers, scattered buildings, a water well, and the SNCC rapid infiltration ponds. Visual impacts would be reduced by the use of a color that would blend with the desert landscape, installation of shielded lighting to reduce glare, and limiting the use of lighting to locations where it is necessary to meet security and worker safety needs. Therefore, visual impacts resulting from the introduction of the water treatment plant are expected to be negligible.

Water Supply Pipeline

Visual impacts associated with the construction of the water supply pipeline are expected to be limited to temporary surface disturbance along the UPRR ROW or within the Ivanpah-Mead/Ivanpah-Table Mountain Transmission Line corridor. Surface disturbance would include a 40-foot-wide corridor where vegetation would either be removed or disturbed as a result of pipe laying activities. Visual impacts associated with removal of vegetation

would be attenuated over time as the site restoration/revegetation is implemented.

Transmission Lines

Visual impacts associated with the construction and operation of transmission lines for the Primm Plant Site alternative would essentially be the same as visual impacts discussed in Section 5.1.11 for the Goodsprings Plant Site.

Impacts Associated with KOP #3

Key observation point #3 is a westbound view from Sandy Valley Road of the IEC transmission line interconnection to the proposed Table Mountain Substation. As discussed in Section 5.1.11 – Transmission Lines, the proposed substation is not a component of the IEC project; therefore, results of the visual impacts analysis are reported separately for the transmission line and the substation.

Transmission Line Interconnection

Based on the contrast evaluation (See Appendix I), the visual contrast associated with the proposed transmission line interconnection to the substation would be the same as reported in Section 5.1.11 for KOP #3. The contrast evaluation indicated a "weak" visual contrast resulting in a negligible impact (KOP #3, See Figure 5-9).

Table Mountain Substation

As previously reported in Section 5.1.11, the visual contrast associated with the proposed substation (KOP #3) would be "strong" resulting in a significant impact (Figure 5-9). Fencing the substation facility with materials and colors that blend with the surrounding landscape, would minimize visual impacts associated with the substation.

Impacts Associated with KOP #4

Key observation point #4 is an eastbound view from Sandy Valley Road of the IEC transmission line interconnection to the proposed Table Mountain Substation. Visual impacts associated with KOP #4 would be similar to the impacts described for KOP #3. As mentioned above, the proposed substation is not a component of the IEC project; therefore, results of the visual impacts analysis are reported separately for the transmission line and the substation.

Transmission Line Interconnection

As previously discussed in Section 5.1.11, the contrast evaluation (See Appendix I) indicates that visual contrast associated with the proposed transmission line interconnection to the proposed substation would be "weak" resulting in a negligible impact.

Table Mountain Substation

According to the contrast evaluation, visual contrast associated with the proposed substation would be the same as reported in Section 5.1.11. The contrast evaluation indicated a "strong" visual contrast resulting in a significant impact. Fencing the substation facility with materials and colors that blend with the surrounding landscape would minimize visual impacts associated with KOP #4.

Impacts Associated with KOP #5a

As discussed in Section 5.1.11, two contrast evaluations were conducted for KOP #5 where the proposed trans-

mission line (Ivanpah-Table Mountain) crosses I-15. KOP #5a evaluated the transmission line crossing using Coreten structures; KOP #5b evaluated the same crossing using gray-painted structures.

Visual impacts associated with transmission line crossing I-15 would be the same as the visual impacts reported for the Goodsprings Plant Site. According to the contrast evaluation discussed in Section 5.11.1 (Appendix I), the visual contrast associated with the transmission line crossing I-15 using Coreten structures (KOP#5a, Figure 5-11) would be "weak" resulting in a negligible impact.

Impacts Associated with KOP #5b

Visual impacts associated with the transmission line crossing I-15 for the Primm Plant Site alternative would be same as the impacts associated with the Goodsprings Plant Site. As discussed in Section 5.11.1, based on the contrast evaluation (Appendix I), the visual contrast associated with the transmission line crossing I-15 using medium gray-painted structures (KOP #5b, see Figure 5-12) would be "weak" resulting in a negligible impact.

Impacts Associated with KOP #6

Based on the contrast evaluation (Appendix I), the visual contrast associated with transmission line Alternatives A and C (KOP #6, Figure 5-13) where the transmission line crosses U.S. 95 south of the dry lakebed would be "weak." As previously discussed in Section 5.1.11, with the presence of five existing transmission lines, introduction of a new transmission line would not be noticeable to the casual observer, particularly the motorist traveling U.S. 95 whose view would be brief and of short duration. Therefore, visual impacts associated with transmission line Alternatives A and C, would be negligible.

Impacts Associated with KOP #7

From KOP #7, the contrast evaluation (Appendix I) indicates there would be "weak" visual contrast associated with Alternatives B and D (see Figure 5-13) where the transmission line crosses U.S. 95 north of the dry lakebed. The proposed transmission line would parallel two existing lattice structures. As discussed in Section 5.1.11, the presence of a new transmission line would be noticeable, but not to the extent that the modification to the landscape would dominate the view shed or attract the attention of motorist traveling U.S. 95. Therefore, visual impacts associated with transmission line Alternatives B and D would be negligible.

Potential Impacts Not Associated with a KOP

The proposed transmission line (Ivanpah-Mead) would cross the McCullough Range in a VRM Class II area; however, the transmission line alternatives would be located within a BLM-utility corridor and would parallel three existing transmission lines. Since the landscape has been previously modified with the presence of existing structures, visual impacts resulting from an additional transmission line would be negligible. Additionally, the proposed transmission line enters a portion of the project area that would be "seldom seen," where the likelihood exists that only the casual recreational user would be affected.

The portion of the transmission line that would pass through the McCullough Range also would pass between the boundaries of two BLM-designated Wilderness Study Areas (WSA), the North McCullough Mountains WSA to the north and the South McCullough Mountains WSA to the south. Since the transmission line alternatives would not be constructed within the Wilderness Study Areas, visual impacts are not expected to occur.

5.2.12 Climate and Air Quality

Summary of Air Quality Impacts and Mitigation	
Significance Criteria: Violation of ambient air quality standards	
Summary of Impacts	**Mitigation Measures**
Plant Site: Short-term increase in PM_{10} and emissions from heavy equipment during site preparation and facilities construction, resulting in a negligible impact to regional air quality. Plant operations would result in negligible impacts to regional air quality.	Compliance with Clark County dust control regulations.
Access Roads: None required.	N/A
Water Treatment Plant: Short-term increase in PM_{10} and emissions from heavy equipment during site preparation and facilities construction, resulting in a negligible impact to regional air quality.	Compliance with Clark County dust control regulations.
Water Supply Pipeline: Short-term increase in PM_{10} during pipeline installation resulting in a negligible impact to regional air quality.	Compliance with Clark County dust control regulations. Revegetation of disturbed areas, following construction.
Transmission Lines: Short-term increase in PM_{10} during construction resulting in a negligible impact to regional air quality.	Compliance with Clark County dust control regulations. Revegetation of temporarily disturbed areas, following construction.

Air quality impacts would result from increased dust that would be created during land clearing, site preparation, and vehicle movement. Wind-driven dust also would be increased as a result of land disturbance. Construction equipment, earthmoving equipment, and vehicle operations also would result in increased emissions at work sites. Emissions from the Ivanpah Energy Center would result from plant operations; however, best available control technology would be used to minimize levels. Impacts to air quality would not be significant.

Primm Plant Site Alternative

Construction of the Ivanpah Energy Center at Primm and the 3.2-mile-long natural gas pipeline from the KRGT pipeline would result in increased PM_{10} levels during the period when the site is being cleared (approximately three to four months). The level of PM_{10} would be controlled (to the extent practicable) by use of water in accordance with the Clark County dust control permit.

The proposed power plant will be a source of combustion-generated emissions to the air. The emissions from the natural gas-fueled combustion turbines will be controlled by the Best Available Control

Technology (BACT) as described in Section 5.1.12.

The applicant completed dispersion modeling for the Goodsprings site (refer to Section 5.1.12) to evaluate the potential impacts of the emissions of these criteria (i.e., regulated) air pollutants on the ambient air relative to the air quality standards. Dispersion models used are those specified by the DAQM. The models used meteorology representative of worst-case conditions. Plant emissions characteristics at the Primm site would be identical to those modeled for the Goodsprings site.

When using worst-case meteorological conditions and modeling the proposed plant alone, the only difference evident in the model would be the height of nearby terrain. The flatter terrain at the Primm site would result in somewhat lower impacts than the impacts determined for the Goodsprings site. These impacts would be additive to air quality impacts from the Reliant Bighorn plant. Based on anticipated IEC impacts combined with impacts from the Bighorn plant, as reported in the EA for that project (URS, 2001), no violations of air quality standards would be predicted.

Deterioration of air quality and health issues associated with construction of the proposed project.

Access Roads

Access to the Primm Plant Site would utilize an existing paved access road to the Reliant Bighorn facility. New access roads would not be needed.

Water Treatment Plant

Construction of the wastewater treatment plant would result in increased PM_{10} levels during the period when the site is being cleared and during pipeline installation (approximately three to four months). The level of PM_{10} would be controlled (to the extent practicable) by use of water in accordance with the Clark County dust control permit as described in Section 5.1.12.

Water Supply Pipeline

Construction of the water supply pipeline would result in increased PM_{10} levels during the period of construction as discussed in Section 5.1.12.

Transmission Lines

Construction of the transmission lines would result in increased PM_{10} levels during the period of construction. The level of PM_{10} would be controlled (to the extent practicable) by use of water in accordance with the Clark County dust control permit (refer to Section 5.1.12).

5.2.13 Noise

Summary of Noise Impacts and Mitigation	
Significance Criteria: Exceeds county noise standards at sensitive receptors.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Moderate short-term construction noise during 22-month period. Operational noise from plant to sensitive receptors expected to be negligible.	Limit construction activities to daytime hours.
Access Roads: Not required.	Not applicable.
Wastewater Treatment Plant: Moderate short-term noise during construction.	Limit working period to daytime hours.
Water Supply Pipeline: Negligible short-term construction noise during construction. Negligible impacts during plant operations.	None required.
Transmission Lines: Moderate short-term construction noise during construction. No impacts during operation.	Limit working period to daytime hours in locations that may affect sensitive receptors.

Construction of the Ivanpah Energy Center at Primm and related project components would result in temporary noise impacts due to equipment movement and construction activities. Long-term impacts could result from plant operations. The severity of impacts would direct relate to the magnitude and amplitude of sound that is generated, duration of the sound, and the sensitivity of receptors that are impacted by the sound. Due to the industrial setting of the Goodsprings plant site, impacts from noise would be less than significant.

Primm Plant Site Alternative

Noise levels associated with operation of the Ivanpah Energy Center are addressed in Section 5.1.13 which indicate intensity levels at plant boundaries would be expected to range from 35.1 to 39.0. Although modeling would be required to fully estimate noise levels at the Primm Plant Site, they are likely to be similar to those reported for the Goodsprings location.

The Ivanpah Energy Center Primm Plant Site would be approximately 1.5 miles from the nearest noise receptor, which is a parking lot east of Buffalo Bill's Casino and a trailer park that is east of Primm Casino. Based on attenuation of noise over distance, noise levels at the two locations would be below Clark County Residential District Nighttime Limits of 43 dBA or Business and Industrial District Nighttime Limits of 49 dBA during plant operations.

Modeling that was performed for the Reliant Bighorn Facility was based on the simultaneous operation of two combined cycle generators and eight simple-cycle genera-tors which resulted in 44 to 45 dBA noise levels at the Buffalo Bill's Casino parking lot and the Primm Casino trailer park. Reliant Energy requested, and was granted a variance to exceed Residential District Nighttime Limits (43 dBA).

Additional modeling would be required to determine noise levels at sensitive receptors that would result from simultaneous operation of the Bighorn Facility and the Ivanpah Energy Center. Since the Reliant Energy abandoned the use of the eight simple-cycle units, current output would be expected to be considerably lower than that previously estimated. Additional modeling would be required to accurately reflect the results of the combined noise levels that would result from the simultaneous operation of both facilities under current plant configurations.

Construction noise associated with the movement of heavy equipment and facilities construction would extend over a 22-month period and would be centered on eastern portion of the Reliant Bighorn property. Noise impacts at sensitive receptors (primarily, temporary housing for casino workers) that are approximately 1.5 miles west-northwest of the Primm Plant Site. Due to distance, noise levels at the temporary housing area would be negligible. Information about average daily and peak daily construction-related trips is provided in Section 5.1.13, Table 5-23.

What noise levels would be generated from the plant?

Primary noise sources associated with the Ivanpah Energy Center were described in Section 5.1.13. Additional high levels of noise would occur as part of the steam bypass system, which activates as a safety release, when needed.

Access Roads

Access to the Ivanpah Energy Center at Primm would use Wells Road and an existing access road to the Reliant Bighorn Generating Facility. Additional access roads would not be required.

Water Treatment Plant

Construction of the proposed water treatment plant would be likely to result in short-term moderate noise impacts to area businesses. However, due to distance and the presence of other noise-generating facilities (I-15 traffic, local road traffic, and railroad activities), it is likely that impacts to area businesses would be negligible (regardless of specific plant location selected) during plant operations.

Water Supply Pipeline

Noise impacts associated with the installation of the water supply pipeline would be similar to those of the southern access road. The level of such impacts to sensitive receptors would be short-term and negligible.

Transmission Lines

Due to the overall lack of sensitive receptors along alignment alternatives, short-term noise impacts associated with construction are expected to be negligible, regardless of alternative selected. Long-term impacts during operation are not expected.

Potential Noise Effects on Wildlife

What are the effects of noise on wildlife (e.g. the Desert Tortoise, Bighorn Sheep)?

Moderate short-term impacts to wildlife are expected to result from construction of the Ivanpah Energy Center, the natural gas supply pipeline, water supply pipeline, and transmission line. The magnitude of such impacts would differ with each species. As previously stated (Section 5.1.13), impacts

to desert tortoise are expected to be temporary and minor during construction.

Potential noise impacts to desert bighorn sheep are expected to result in species avoidance where human activity is extensive. Accordingly, it is likely that some individuals would be temporarily displaced, resulting in short-term minor impacts. The extent of impacts to the species is expected to be limited to construction of the Ivanpah to Mead Transmission Line through the McCullough Range.

Based on discussions with members of the Fraternity of Desert Bighorn Sheep (Bentley, 2002), noise associated with blasting has little affect on bighorn sheep herds. However, helicopter over flights typically results in scattering of herds and places stress on individual animals. Consequently, the use of helicopters for pole setting and other activities should be restricted to mountain passes and flights over uplands should be avoided.

5.2.14 Socioeconomics/Environmental Justice

Summary of Socioeconomics Impacts and Mitigation	
Significance Criteria: Induced population growth that would exceed what is considered a normal growth. Substantial use of tax funds by the community that would not be compensated elsewhere. Permanent and irreversible loss of work for a major sector of the community.	
Summary of Impacts	**Mitigation Measures**
Plant Site: Negligible impacts during the 22-month construction phase. Negligible short-term beneficial impact to employment during construction; negligible long-term beneficial impact to employment during plant operation. No short-term impacts to housing; no long-term impact to housing during plant operation. No impacts to community infrastructure. Negligible impacts to property tax revenues. No disproportionate high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.	1. None required for population, employment, housing, schools, or property taxes. 2. Environmental Justice: none required.
Access Roads: None required.	Not applicable.
Water Treatment Plant: Short-term beneficial impacts to employment during construction would be negligible. Negligible long-term beneficial impacts to property tax revenues. No impacts to environmental justice.	**None required**
Water Supply Pipeline: Similar impacts to population, housing, schools, and property taxes as the plant site. Same impacts on Environmental Justice as the plant site. Negligible short-term beneficial impacts to employment during construction.	**None required**
Transmission Lines: Negligible beneficial short-term impacts to employment during construction. Same impacts on Environmental Justice as the plant site.	**None required**

Construction and operation of the Ivanpah Energy Center and related project components would result in beneficial impacts to Clark County. Short-term benefits would include increased employment and tax revenues. Although the magnitude of such beneficial impacts can be measured, when compared to the county as a whole, it is unlikely that those to local communities could not be quantified. Construction workers for the project are likely to originate from the Las Vegas area or consist of workers on temporary assignment from other parts of the country. Due to the lack of housing availability within Primm and proximity to Las Vegas, construction or operation of the facility would not affect population numbers, housing resources, or schools. Construction or operation of the Ivanpah Energy Center or its project components would not affect minority or low-income populations; therefore, related impacts to such populations are not anticipated.

Primm Plant Site Alternative

Potential impacts to Clark County and nearby communities would be negligible, as described for the Proposed Goodsprings Plant Site. Refer to Section 5.1.14 for details.

Population

Changes in population resulting from the construction and operation of the IEC plant and ancillary facilities are not expected. During the 22-month construction period, the majority of plant construction workers would most likely commute from the Las Vegas area.

Employment

Construction of the proposed IEC plant and ancillary facilities in Primm would result in a short-term beneficial impact to employment in the region. During the peak construction period, the maximum number of construction workers would total approximately 287 workers.

Local resident employment for construction and operation of the plant.

Consideration of a training program for local residents for employment in construction or operations of the plant.

Construction payroll costs over the 22-month plant construction period are estimated to be approximately $29 million (IEC, 2002). Refer to Section 5.1.14 for additional information.

Additional employment opportunities would be created from businesses providing construction-related goods and services. It is estimated that $20 - $25 million will be spent locally on construction materials (IEC, 2001).

Approximately 16 new jobs would be created for plant operations. Employees would operate the plant rotating on four shifts. Twenty-five additional employees would be required to perform scheduled maintenance at the plant site twice a year (IEC, 2001). Long-term beneficial impacts resulting from plant operations employment would have a negligible effect to employment in the area.

Housing

Since most employees hired for construction of the IEC plant would commute from the Las Vegas area; it is unlikely that additional housing from the communities of Sandy Valley or Goodsprings would be

required. There is no housing in Primm. Refer to Section 5.1.14 for additional information.

Schools

As mentioned above, employees hired for construction and operation of the IEC plant would most likely commute from the Las Vegas area. It is assumed that students of employees would already be enrolled in Clark County School District. Long-term and short-term impacts to schools and school district resources resulting from construction or operation of the IEC plant would be negligible.

Community Infrastructure

The IEC plant facility would be self-supporting; therefore, the existing infrastructure of Primm would not be burdened with providing electrical service, water, or waste disposal services for construction or operation of the plant.

The plant facility would comply with all regulations required by the Clark County Fire Department and the National Fire Protection Association (NFPA) 850 "Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations." It is unlikely that the plant facility would create an additional burden on existing fire protection, medical emergency, and police protection services in the area.

Retail services such as restaurants and gas stations, particularly in Primm, would most likely experience short-term benefits to revenues with the additional number of construction workers in the area.

Tax Revenue

Economic benefits for local communities.

The proposed project would generate approximately $4 million in annual property tax revenues to Clark County (IEC, 2002). However, the beneficial impact of increased property tax revenues would be negligible to the communities of Primm, Goodsprings, and Jean.

Environmental Justice

There is no evidence that the proposed IEC plant will have a disproportionately high and adverse human health or environmental effects on minority and low-income populations. The proposed IEC project, was evaluated in terms of an adverse effect that:

a. is predominately borne by a minority population and/or low-income population; or,

b. will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or nonlow-income population.

There are no adverse human health or environmental effects resulting from this project or from a cumulative impact associated with land-use. The proposed IEC project would not introduce or be an additional adverse industrial use located in a minority or low-income community.

Access Roads

Existing access roads to the Reliant Bighorn Generating Facility would be used. Therefore, no impacts would occur.

Water Treatment Plant

Construction and operation of the water treatment plant would result in a beneficial impact to employment in the Las Vegas area. Short-term benefits would be derived from construction activities; long-term benefits would result from plant operations. Refer to Section 5.1.14.

Water Supply Pipeline Route

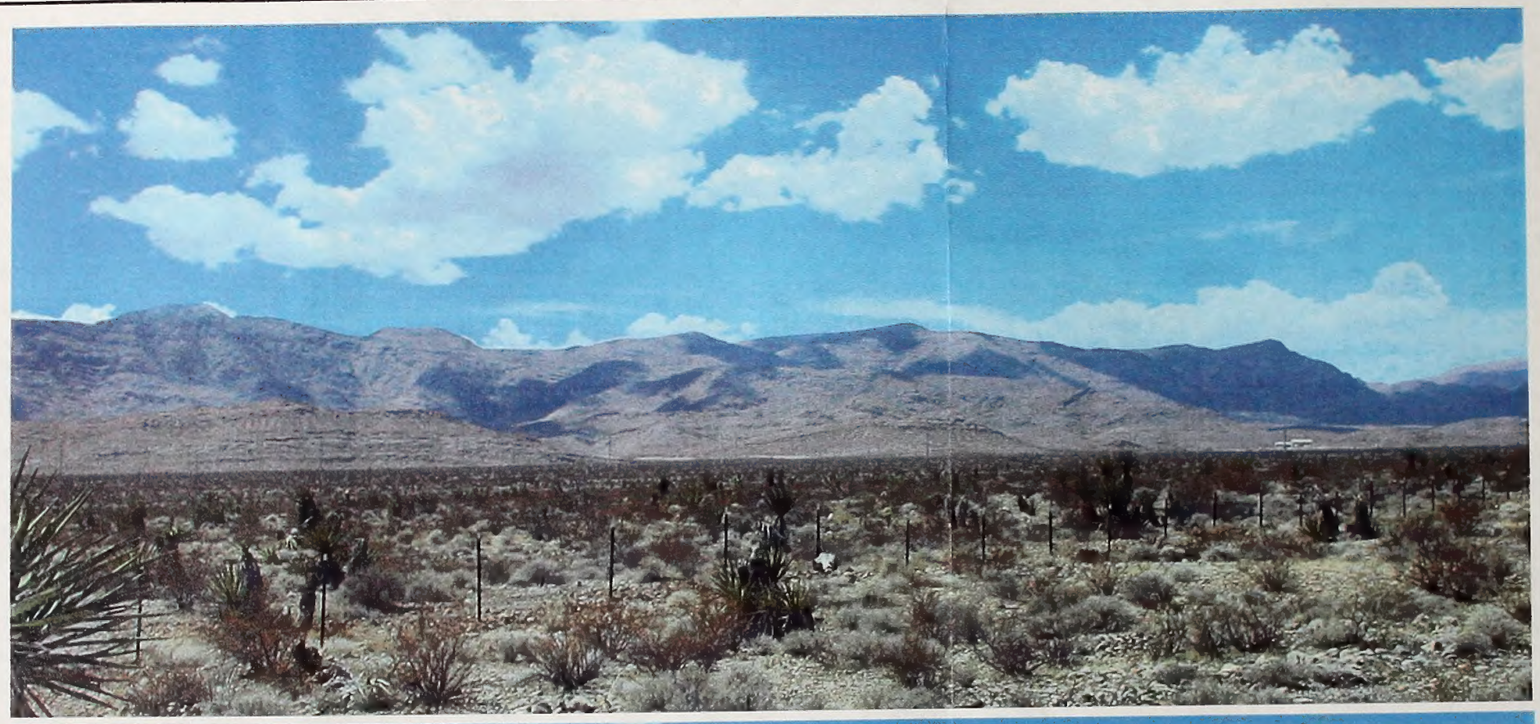
Impacts to socioeconomic resources resulting from the construction of the water supply pipeline and water supply pipeline plant access options would be the same as the impacts described in Section 5.1.14.

There is no indication that adverse impacts associated with Environmental Justice would occur resulting from this component of the proposed project.

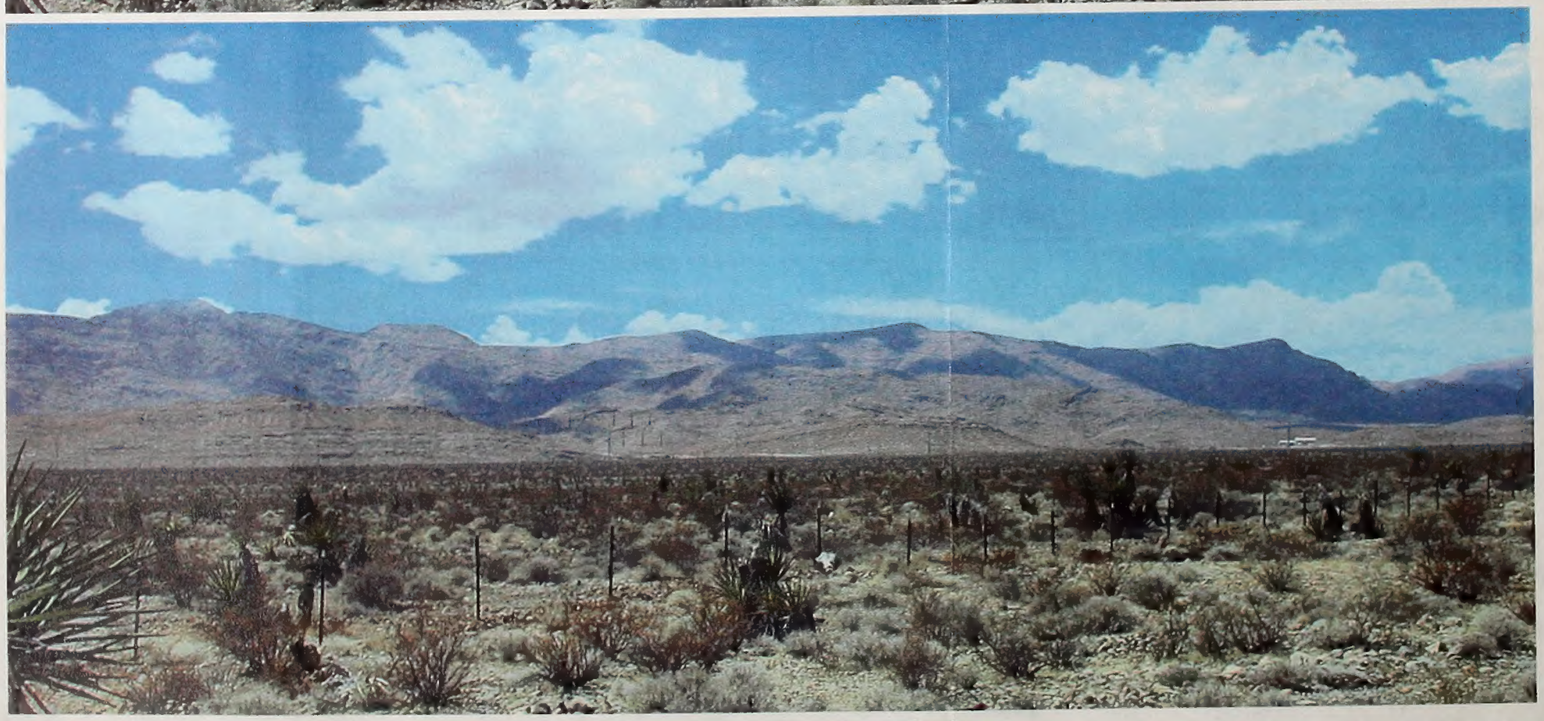
Transmission Lines

Transmission Route alternatives are located within BLM-designated utility corridors and are not within or adjacent to urbanized areas. Potential adverse impacts to the infrastructure of communities are not expected. Construction of any of the four transmission line alternatives would create additional employment opportunities during the 18- to 24-month construction period. The construction period includes three phases requiring approximately 45 to 67 total workers throughout the construction phases. Additional employment opportunities would be created from businesses providing construction-related goods and services. Negligible beneficial impacts to employment associated with construction of the transmission line would be relative to employment county-wide.

There is no indication that adverse impacts associated with Environmental Justice would occur resulting from this component of the proposed project.

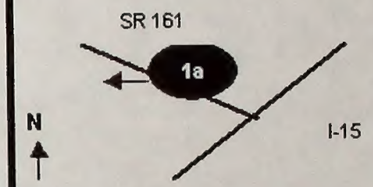


EXISTING VIEW



MODIFIED VIEW

LOCATION



VIEW OF PLANT FROM S.R. 161 (USING CORETEN STRUCTURES)

PREPARED FOR:

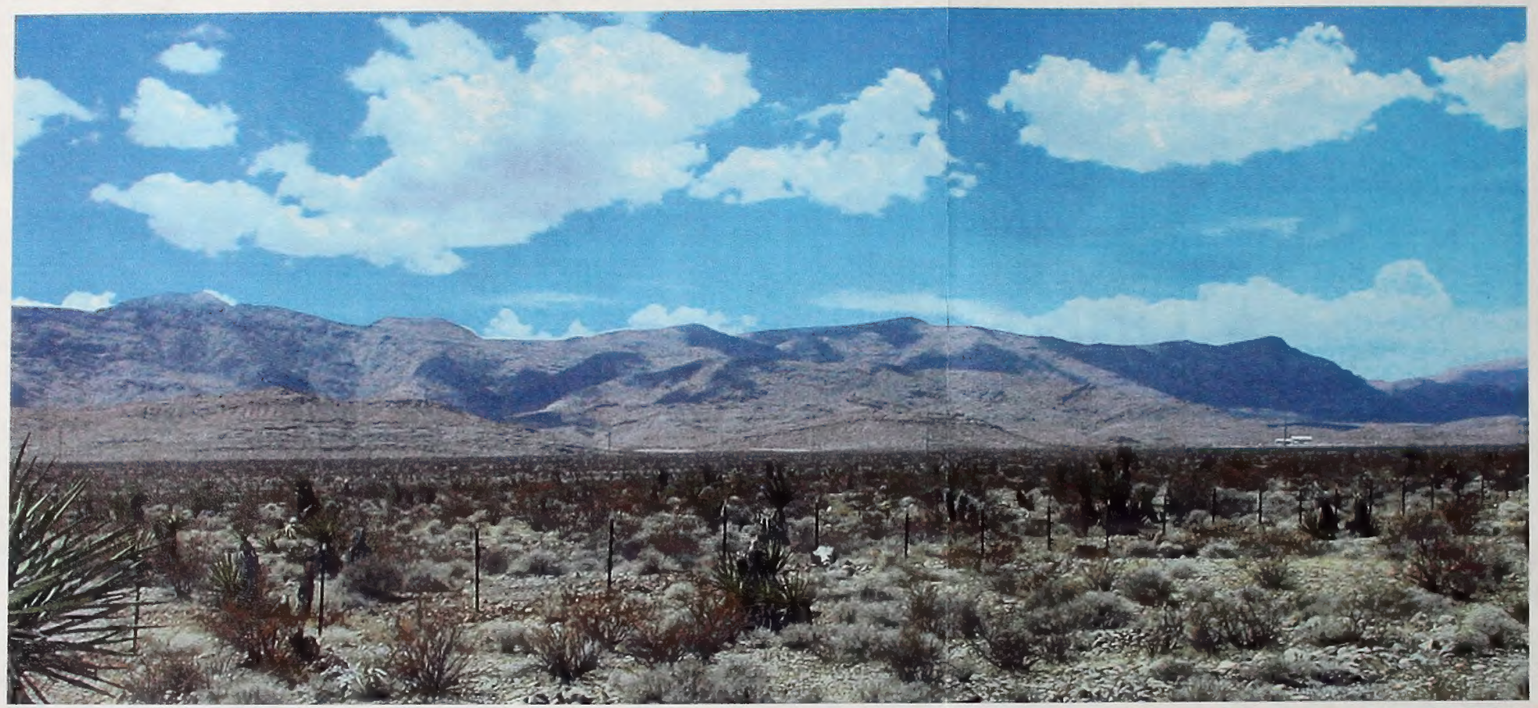
PARSONS

PREPARED BY:

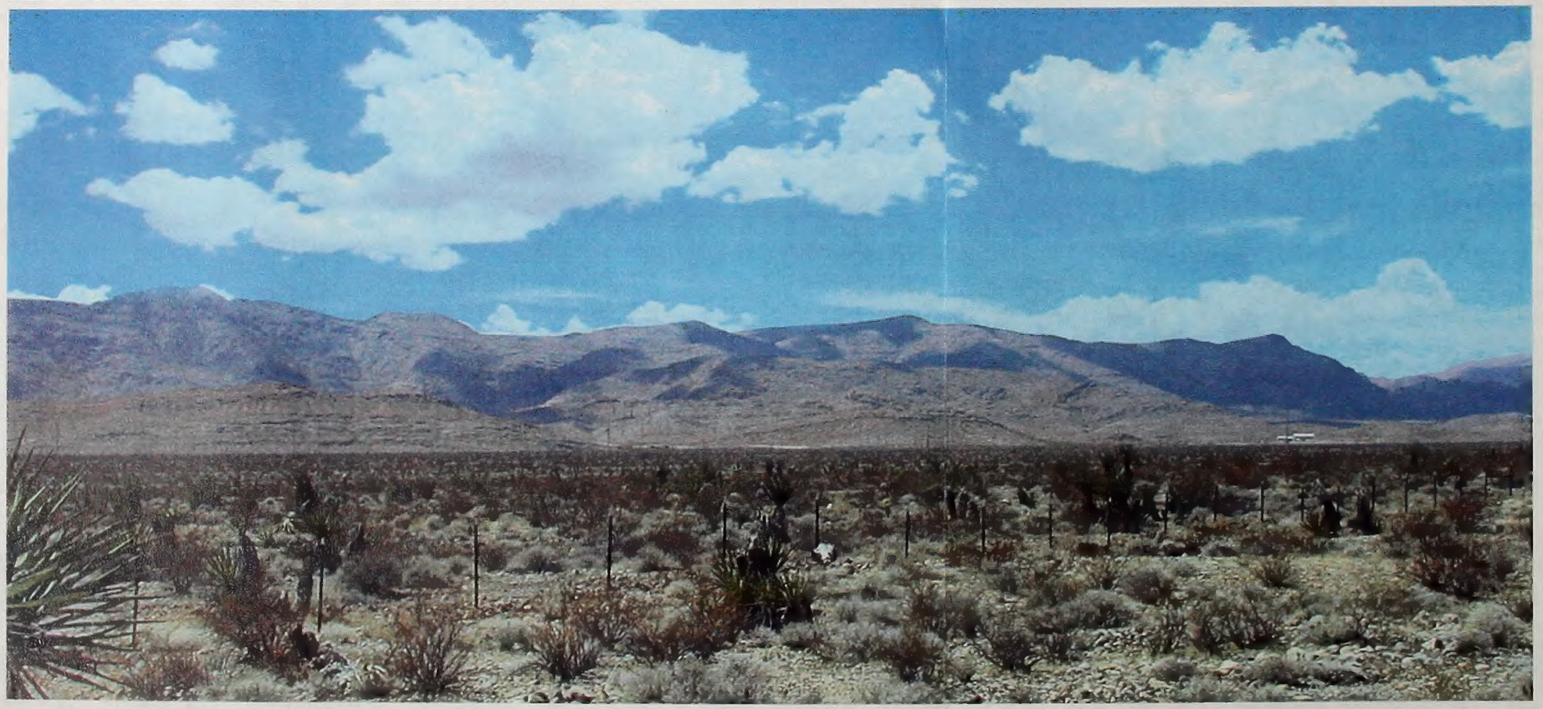
THE Louis Berger Group, INC.

KOP 1a

FIGURE 5-5

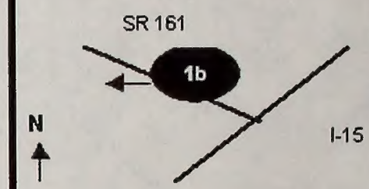


EXISTING VIEW



MODIFIED VIEW

LOCATION



VIEW OF PLANT FROM S.R. 161 (USING GRAY-PAINTED STRUCTURES)

PREPARED FOR:

PARSONS

PREPARED BY:

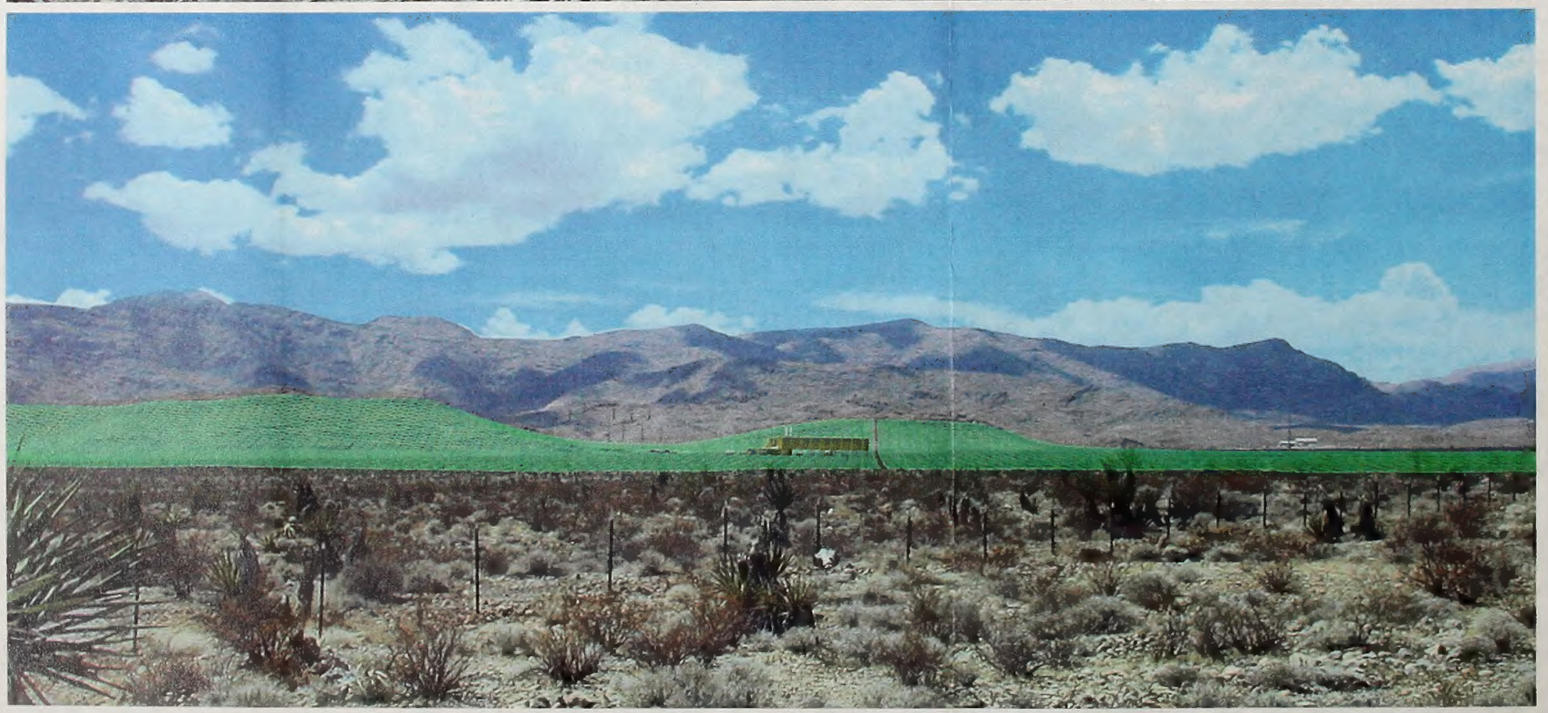
THE Louis Berger Group, INC.

KOP 1b

FIGURE 5-6

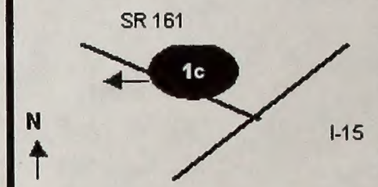


EXISTING VIEW



MODIFIED VIEW

LOCATION



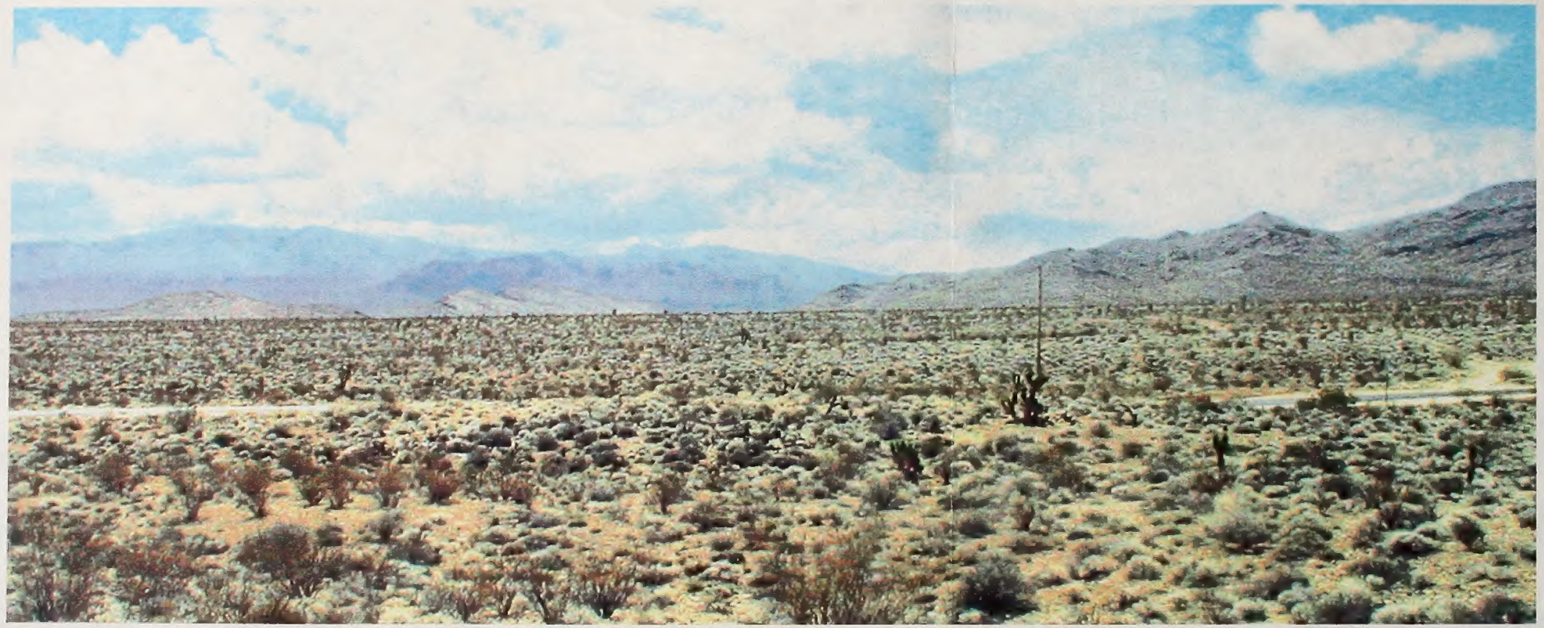
VIEW OF PLANT FROM S.R. 161
(SHOWING POWER PLANT BEHIND TERRAIN GRID)

PREPARED FOR:
PARSONS

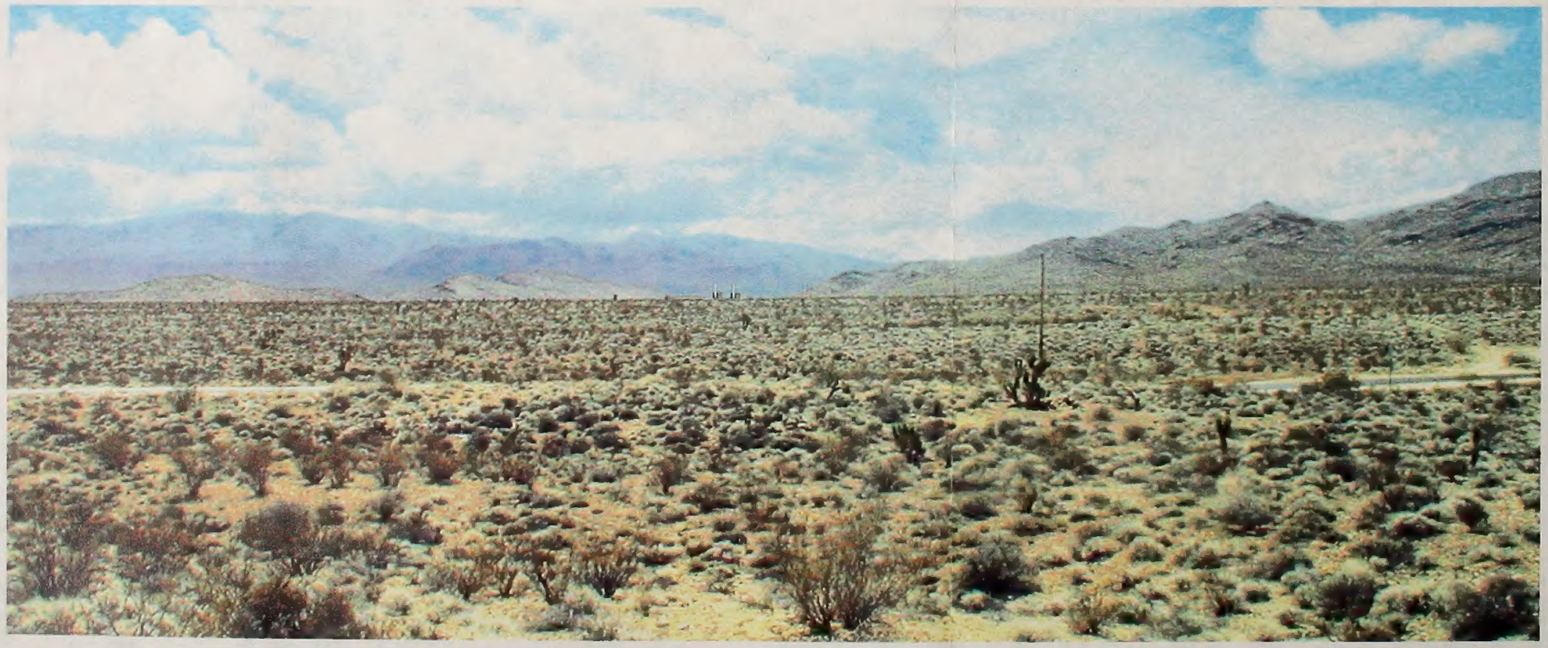
PREPARED BY:
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IVANPAH ENERGY CENTER PROJECT

FIGURE 5-7

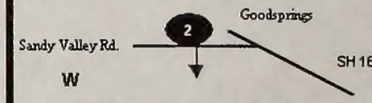


EXISTING VIEW



MODIFIED VIEW

LOCATION



VIEW OF PLANT SITE FROM RESIDENT LOCATED NEAR S.R. 161 AND SANDY VALLEY ROAD

PREPARED FOR:

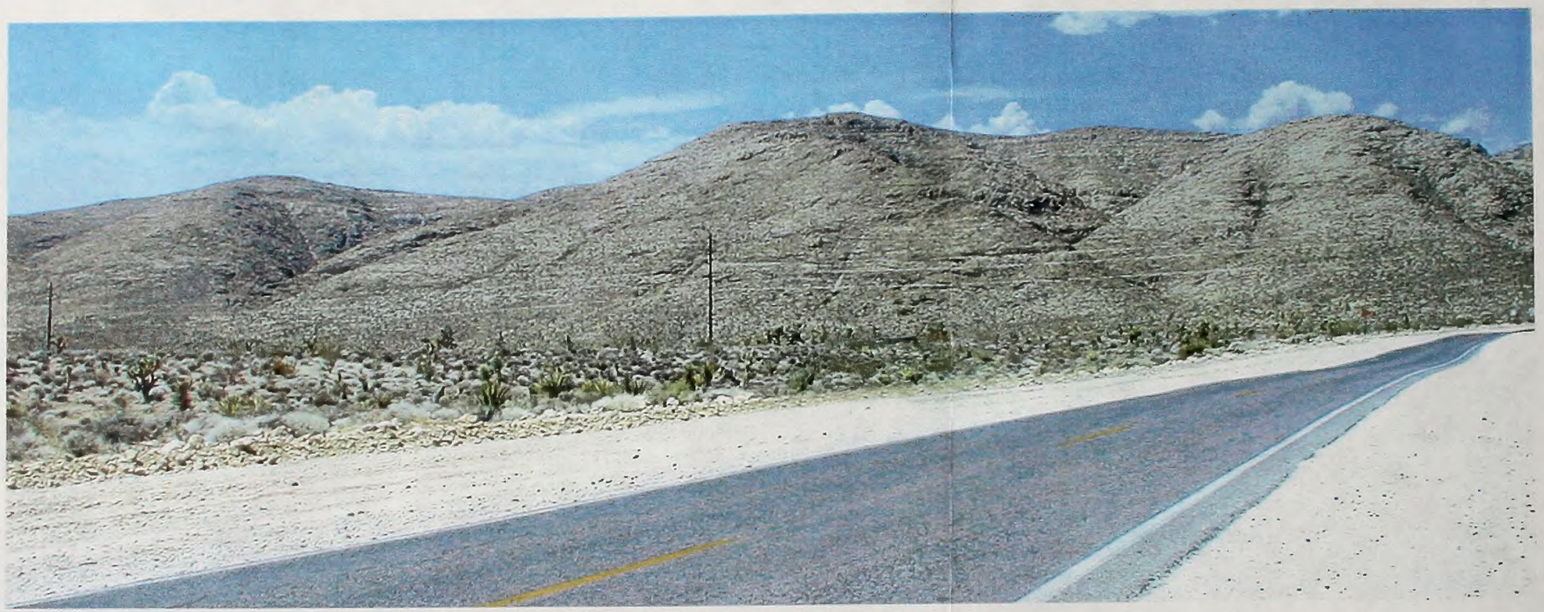
PARSONS

PREPARED BY:

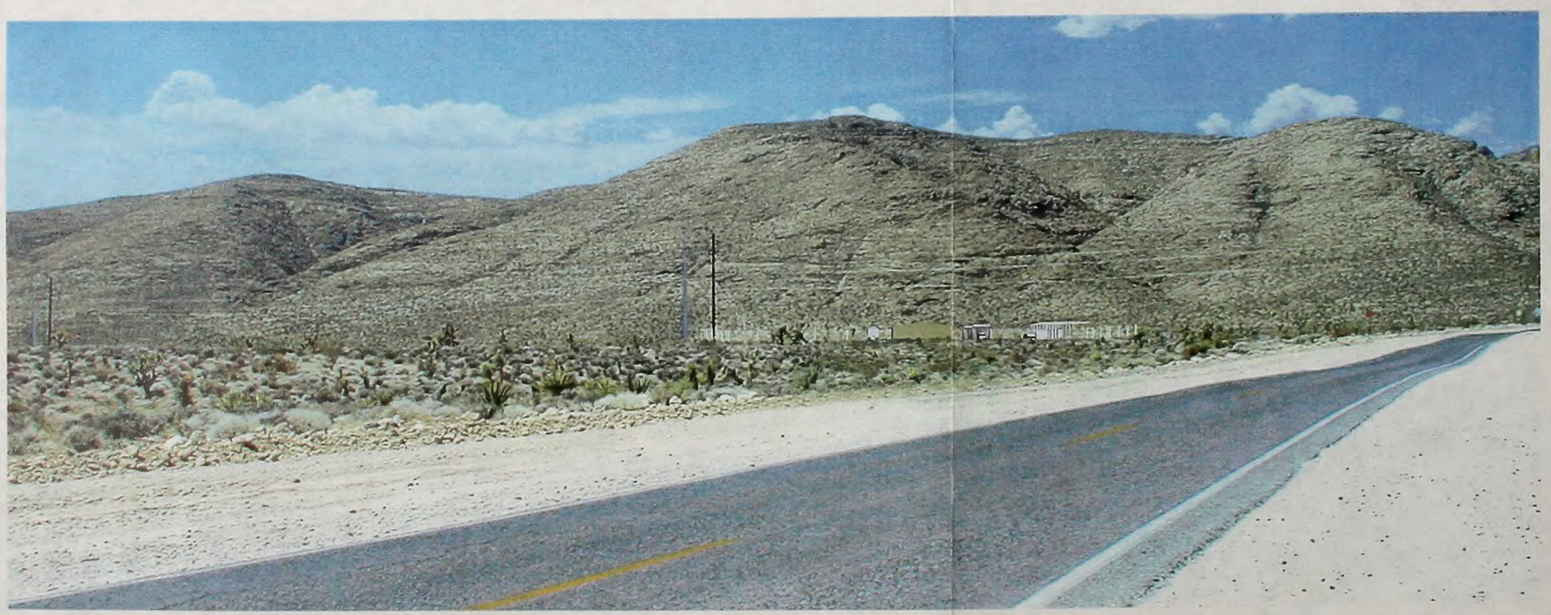
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KOP 2

FIGURE 5-8

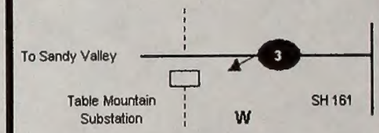


EXISTING VIEW



MODIFIED VIEW

LOCATION



VIEW OF TRANSMISSION LINE INTERCONNECTION TRAVELING WEST ON SANDY VALLEY ROAD

PREPARED FOR:

PARSONS

PREPARED BY:

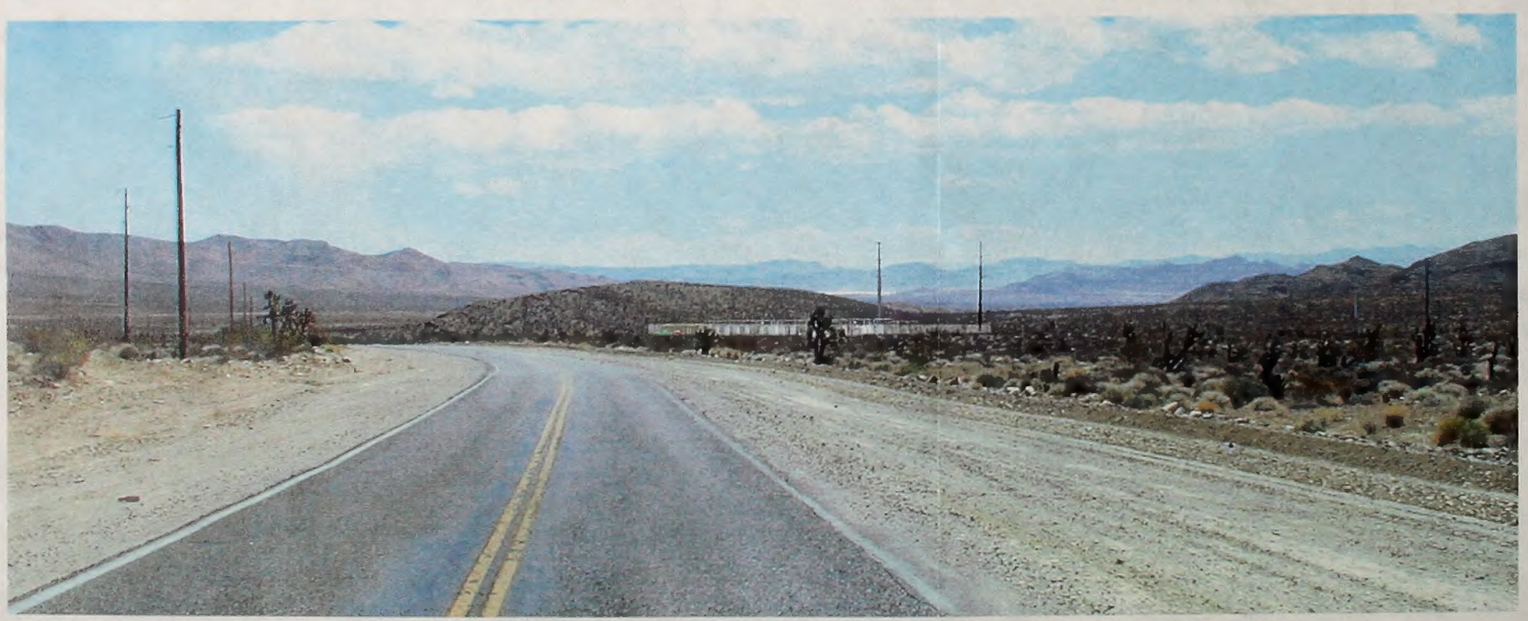
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KOP 3

FIGURE 5-9

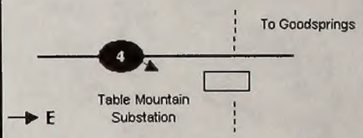


EXISTING VIEW



MODIFIED VIEW

LOCATION



VIEW OF TRANSMISSION LINE INTERCONNECTION TRAVELING EAST ON SANDY VALLEY ROAD

PREPARED FOR:
PARSONS

PREPARED BY:
THE Louis Berger Group, INC.

KOP 4

FIGURE 5-10

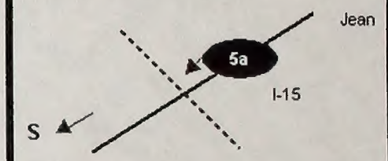


EXISTING VIEW



MODIFIED VIEW

LOCATION



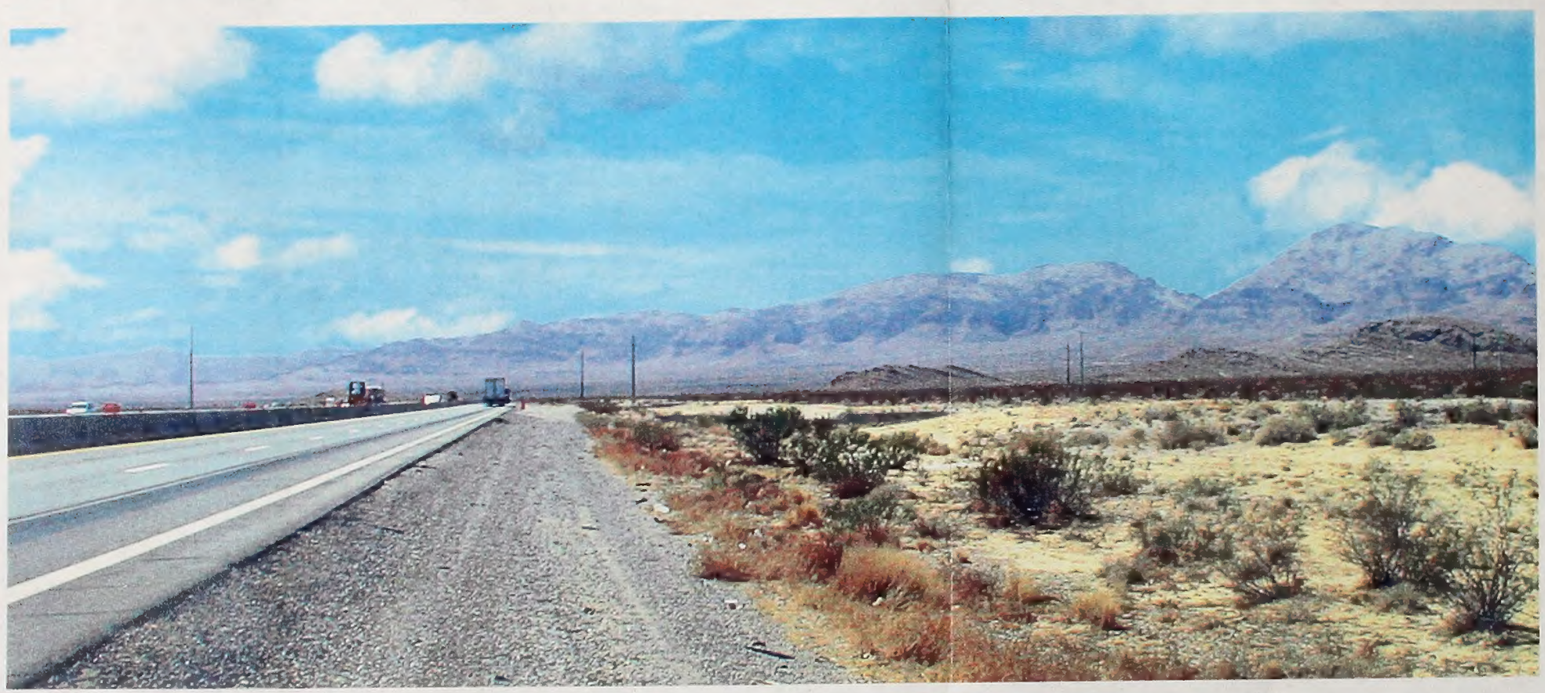
SOUTH VIEW OF TRANSMISSION LINE CROSSING I-15 (USING CORETEN STRUCTURES)

PREPARED FOR:
PARSONS

PREPARED BY:
THE Louis Berger Group, INC.

KOP 5a

FIGURE 5-11

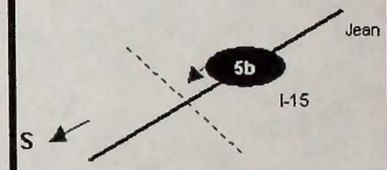


EXISTING VIEW



MODIFIED VIEW

LOCATION



SOUTH VIEW OF TRANSMISSION LINE CROSSING I-15 (USING GRAY-PAINTED STRUCTURES)

PREPARED FOR:

PARSONS

PREPARED BY:

THE Louis Berger Group, INC.

KOP 5b

FIGURE 5-12

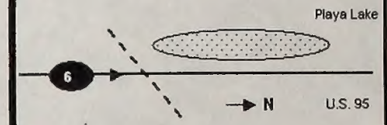


EXISTING VIEW



MODIFIED VIEW

LOCATION



TRANSMISSION LINE ALTERNATIVE E CROSSING U.S. 95 NORTH VIEW

PREPARED FOR:

PARSONS

PREPARED BY:

THE Louis Berger Group, INC.

KOP 6

FIGURE 5-13

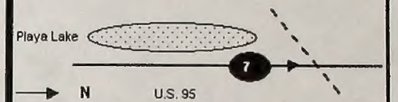


EXISTING VIEW



MODIFIED VIEW

LOCATION



TRANSMISSION LINE ALTERNATIVE C CROSSING U.S. 95 NORTH VIEW

PREPARED FOR:

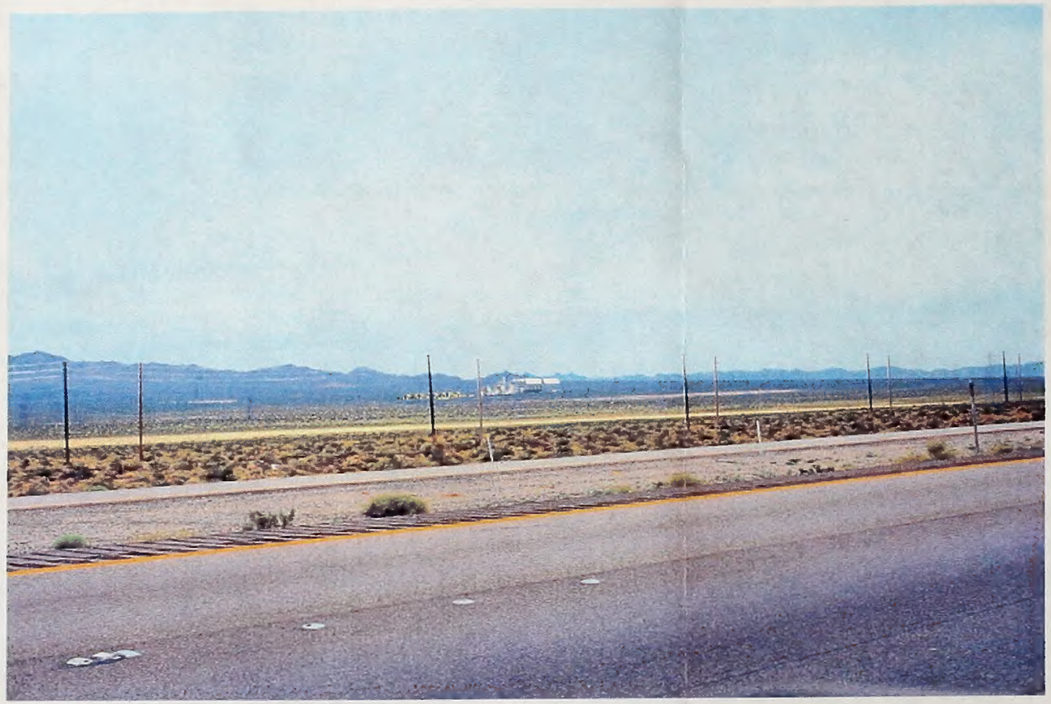
PARSONS

PREPARED BY:

THE Louis Berger Group, INC.

KOP 7

FIGURE 5-14

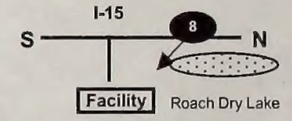


EXISTING VIEW



MODIFIED VIEW

LOCATION



VIEW OF PLANT FROM I-15 TRAVELING SOUTH

PREPARED FOR:

PARSONS

PREPARED BY:

URS

KOP 8

FIGURE 5-15

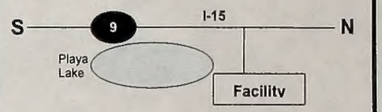


EXISTING VIEW



MODIFIED VIEW

LOCATION



VIEW OF PLANT FROM I-15 TRAVELING NORTH

PREPARED FOR:

PARSONS

PREPARED BY:

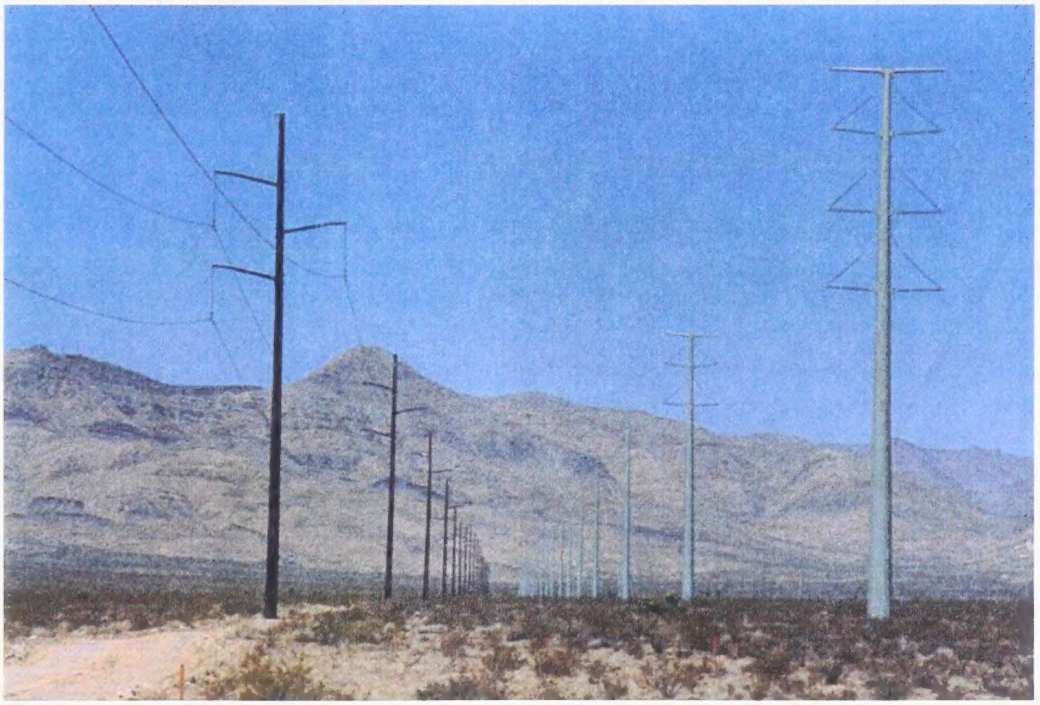
URS

KOP 9

FIGURE 5-16



Photograph A

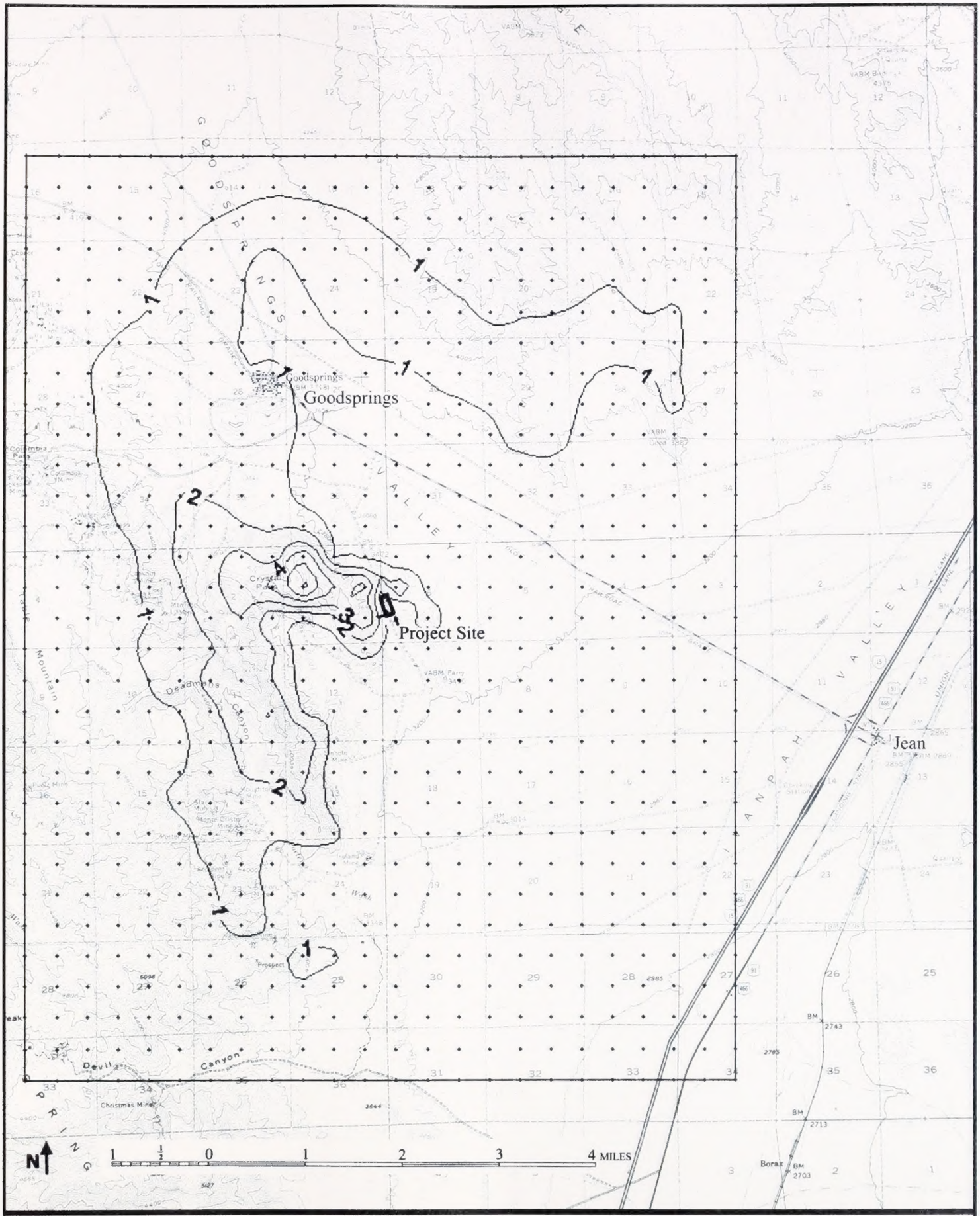


Photograph B

PARSONS

IVANPAH ENERGY CENTER PROJECT

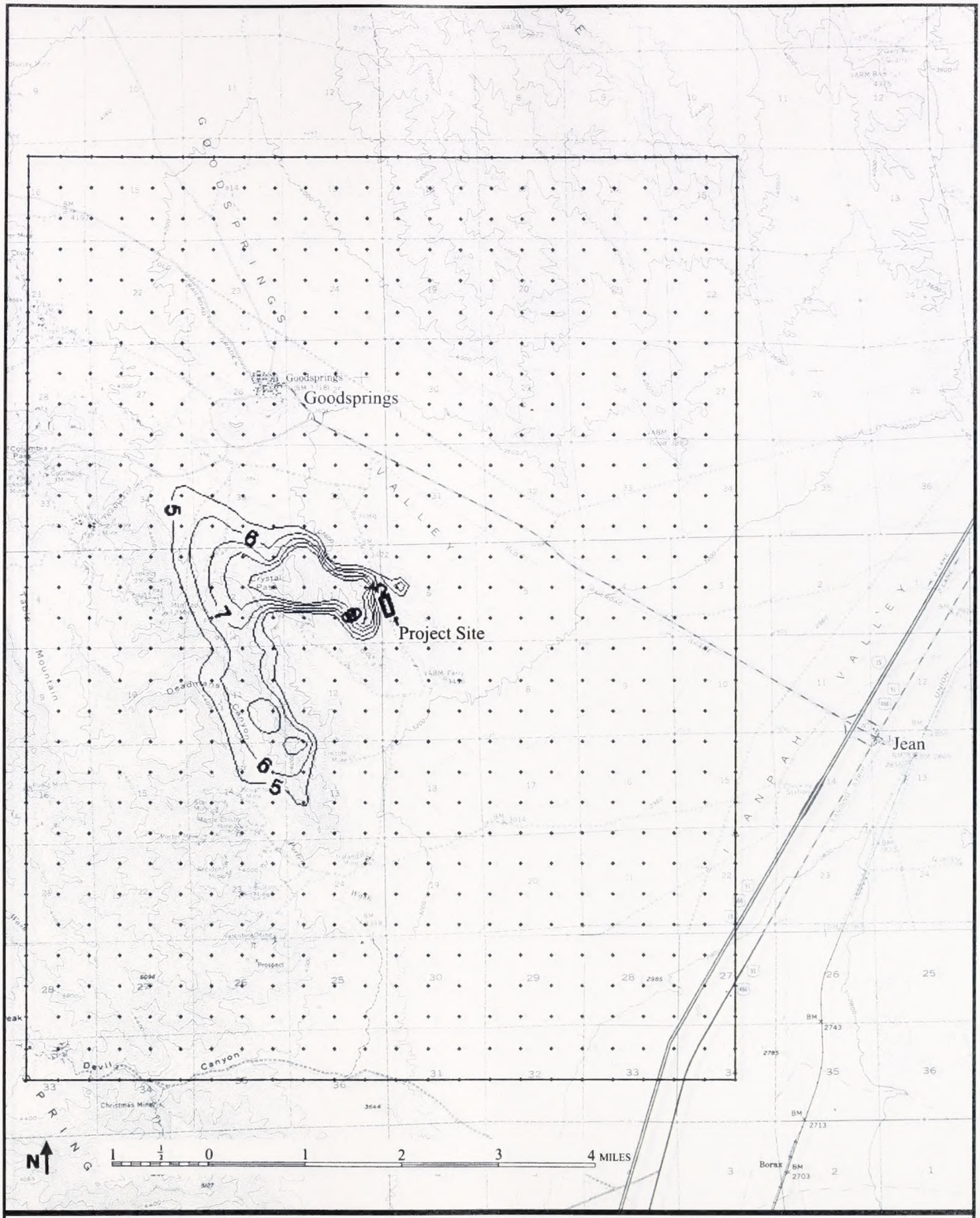
FIGURE 5-17
COMPARISON OF TRANSMISSION LINE STRUCTURE COLOR



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IVANPAH ENERGY CENTER PROJECT

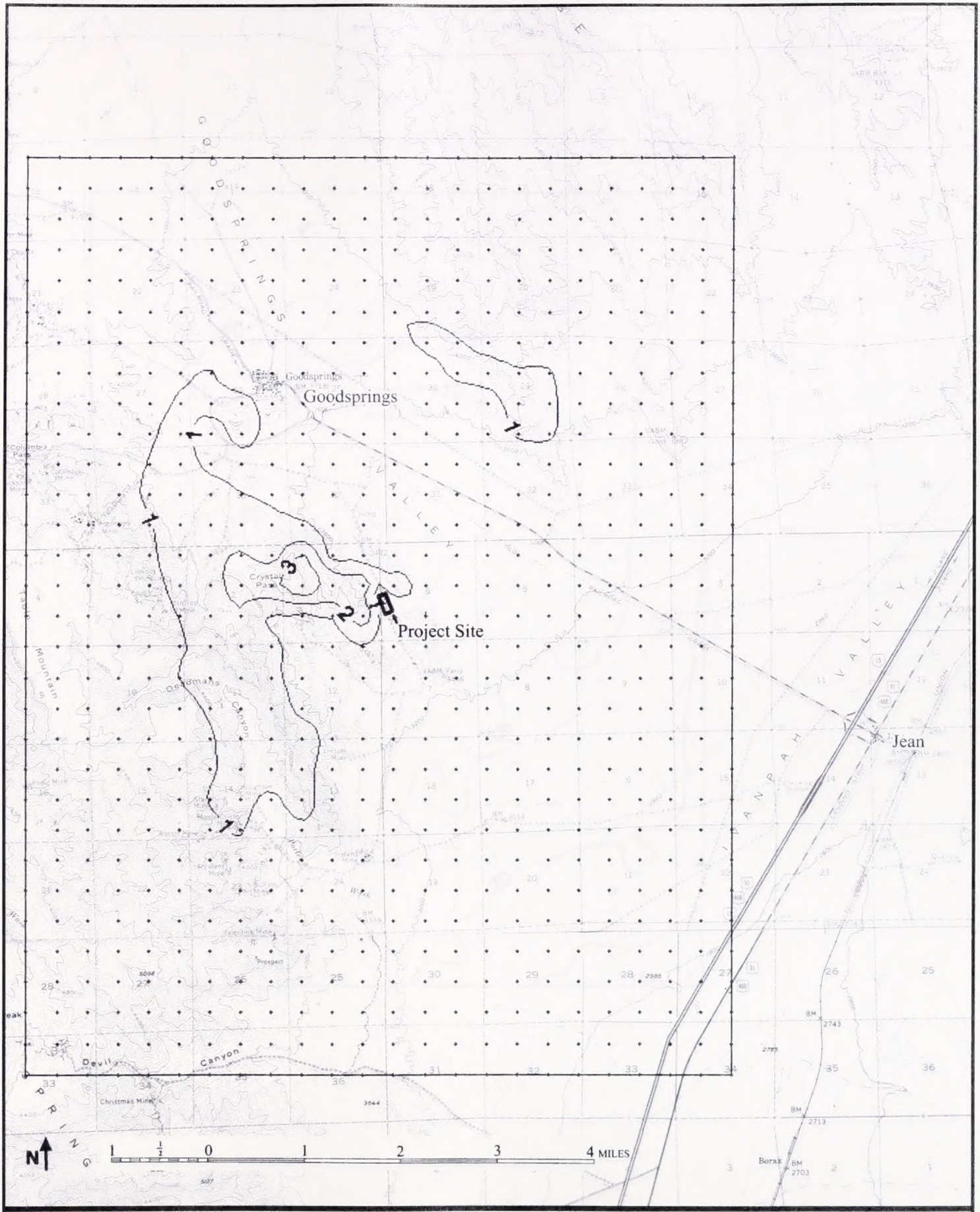
FIGURE 5-18
Annual NO_2 Impacts – Project Only



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IVANPAH ENERGY CENTER PROJECT

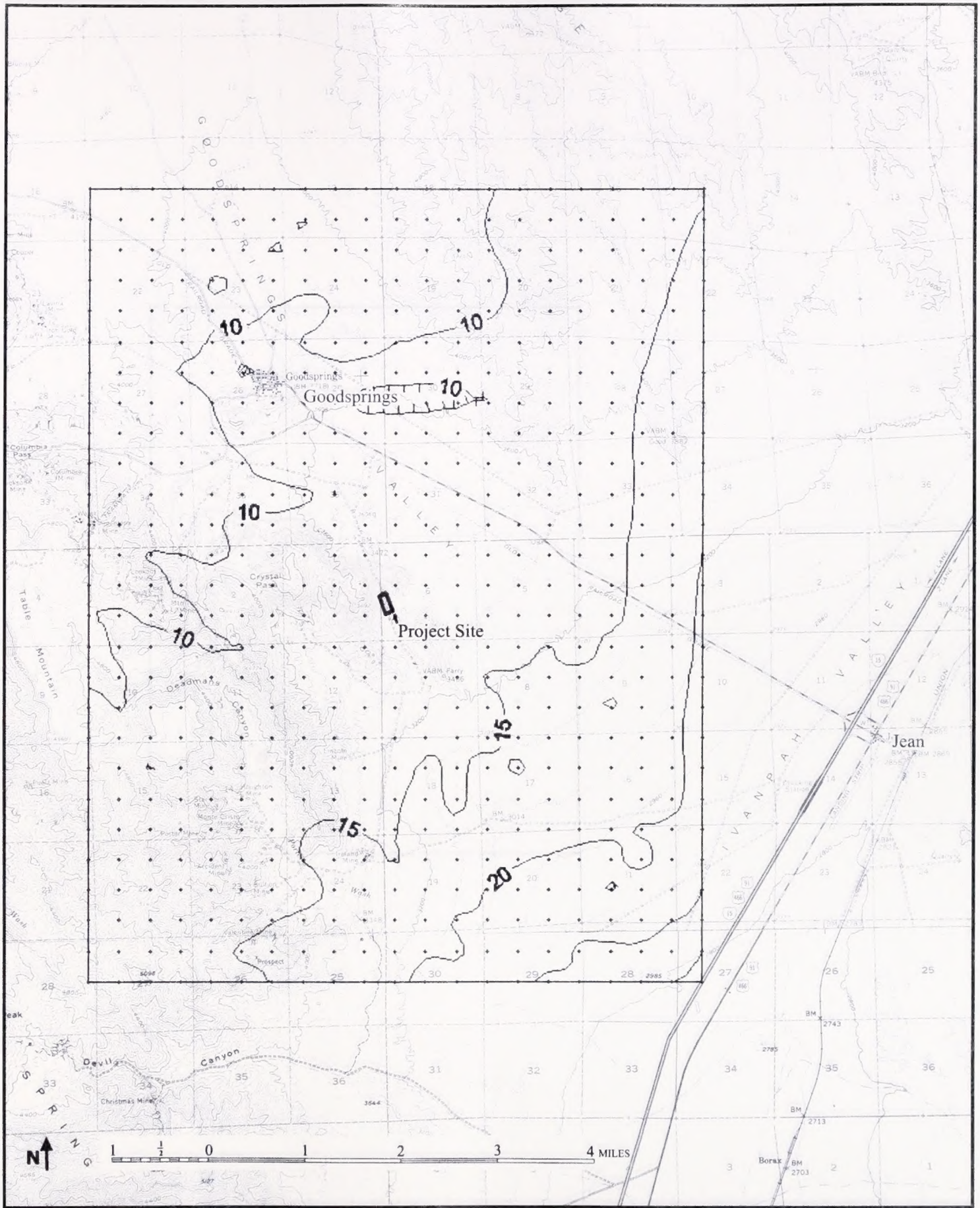
FIGURE 5-19
24-Hour PM_{10} Impacts – Project Only



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IVANPAH ENERGY CENTER PROJECT

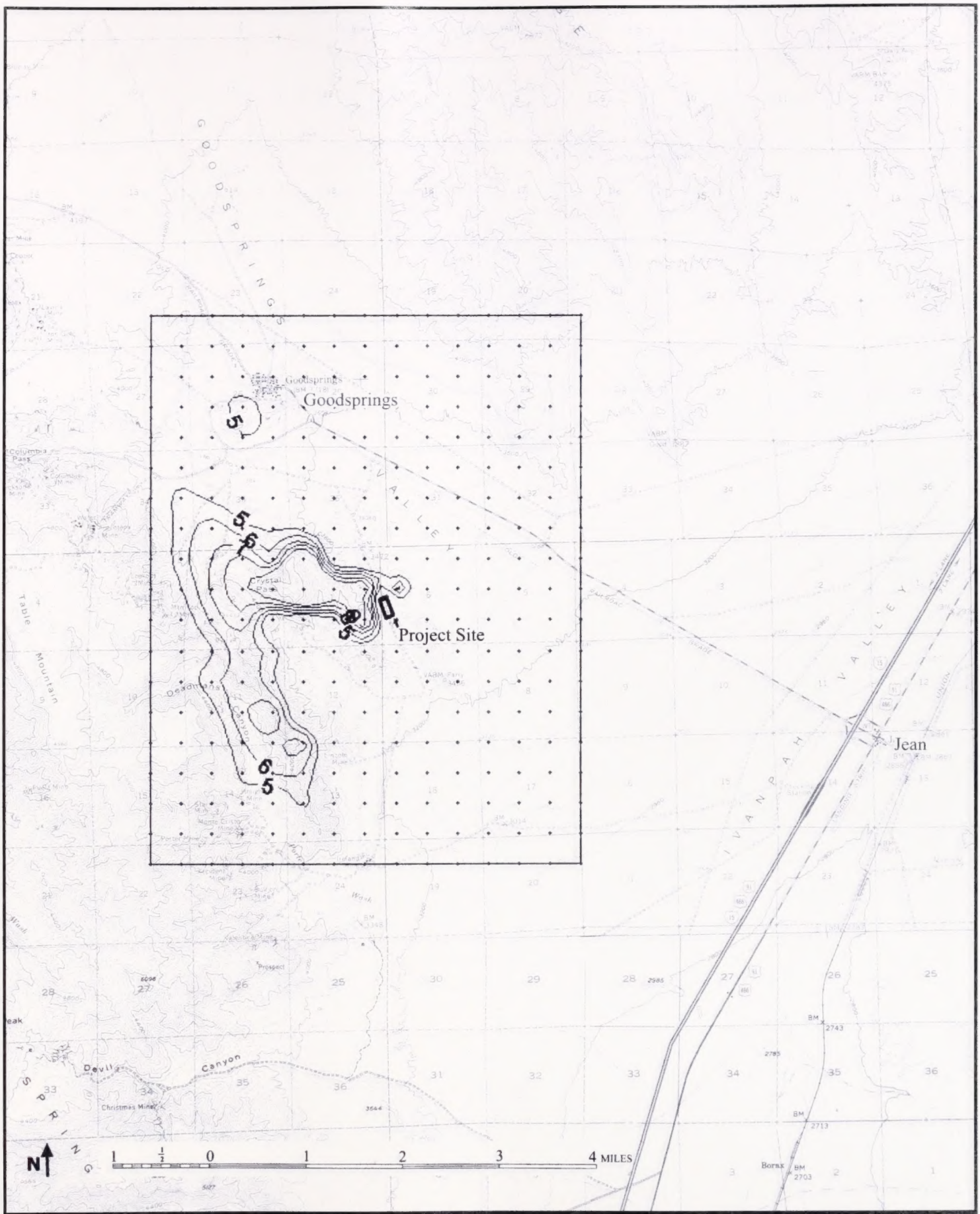
FIGURE 5-20
Annual PM_{10} Impacts – Project Only



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IVANPAH ENERGY CENTER PROJECT

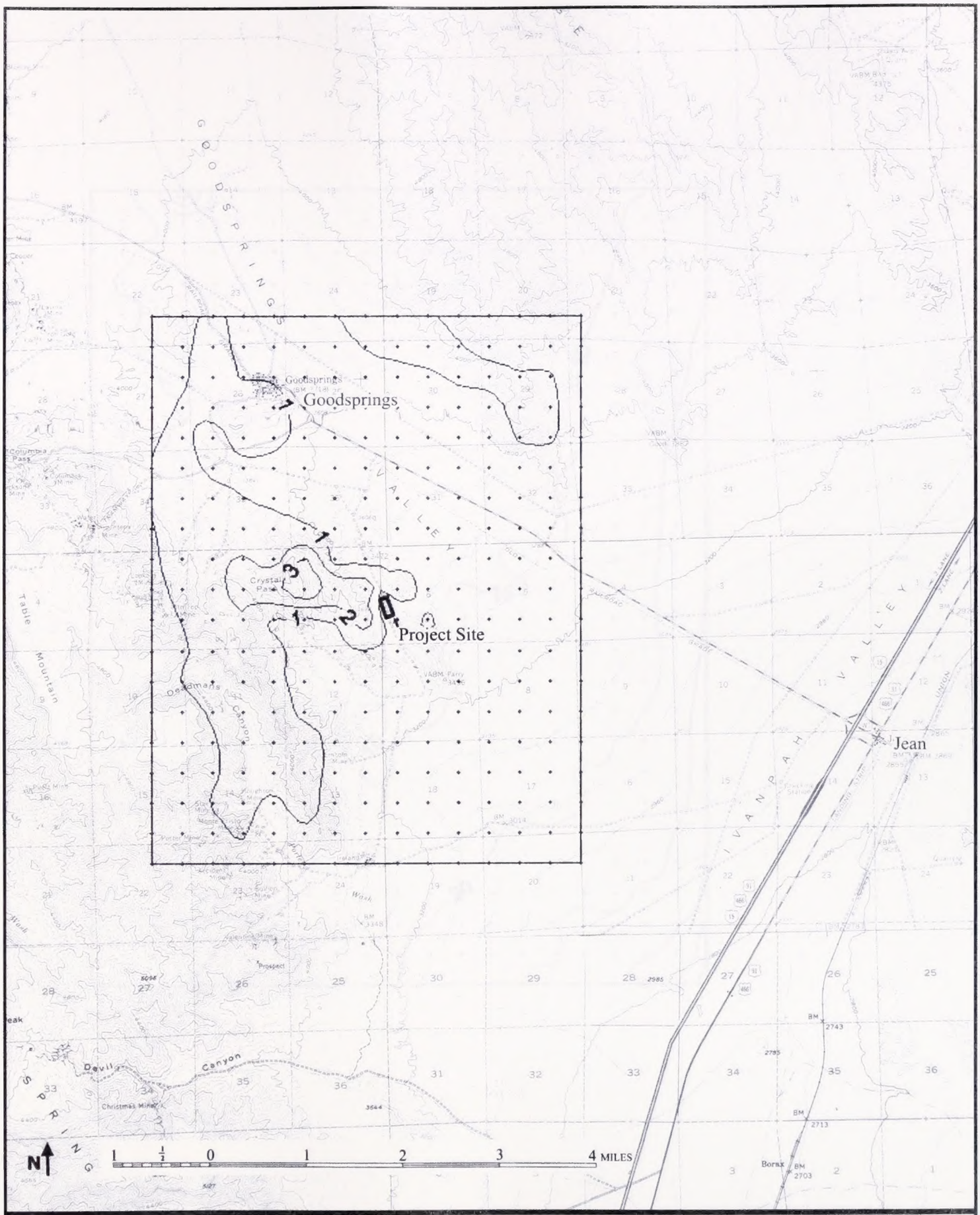
FIGURE 5-21
Annual NO_2 Impacts – PSD Increment



PARSONS

IVANPAH ENERGY CENTER PROJECT

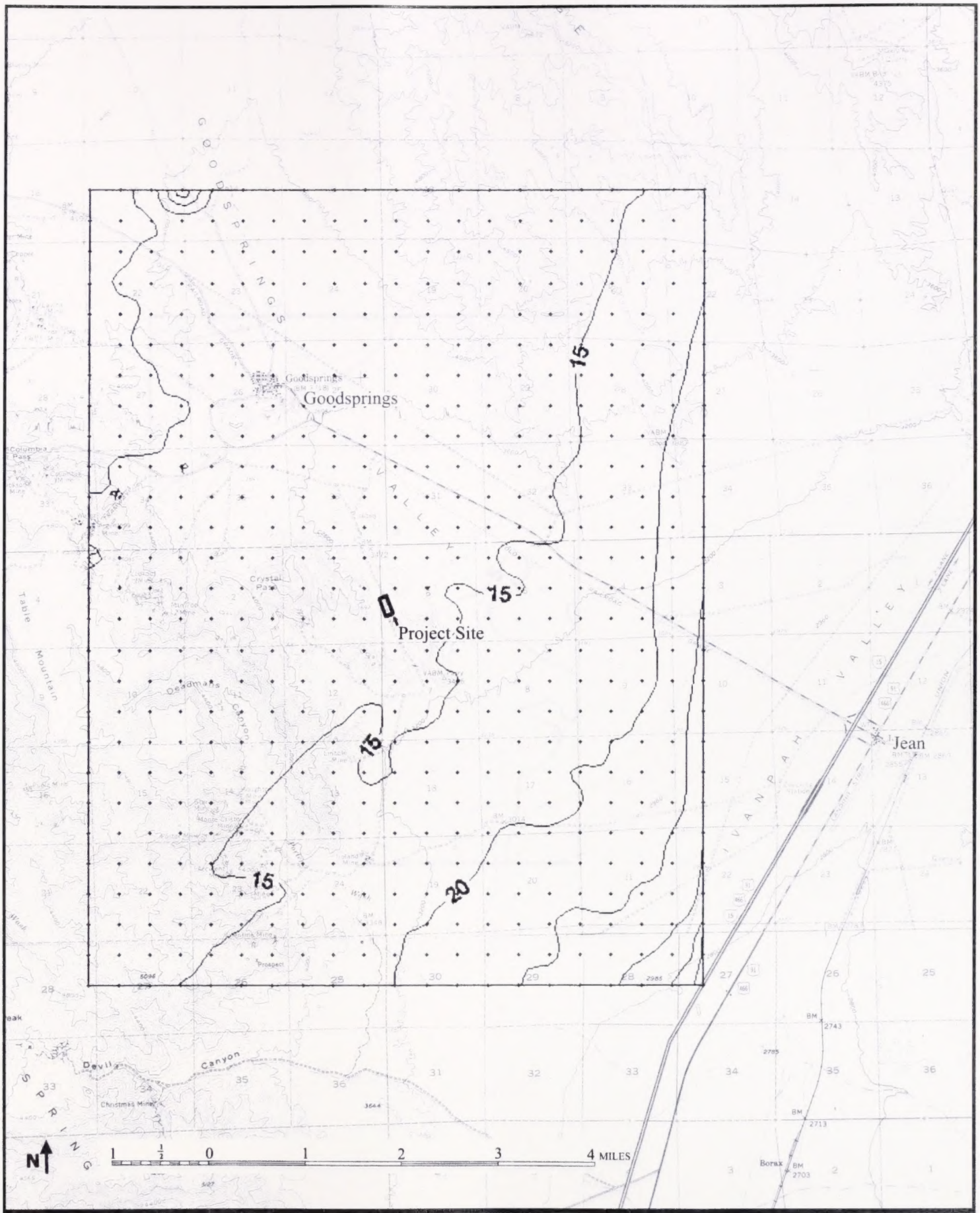
FIGURE 5-22
24-Hour PM_{10} Impacts – PSD Increment



PARSONS

IVANPAH ENERGY CENTER PROJECT

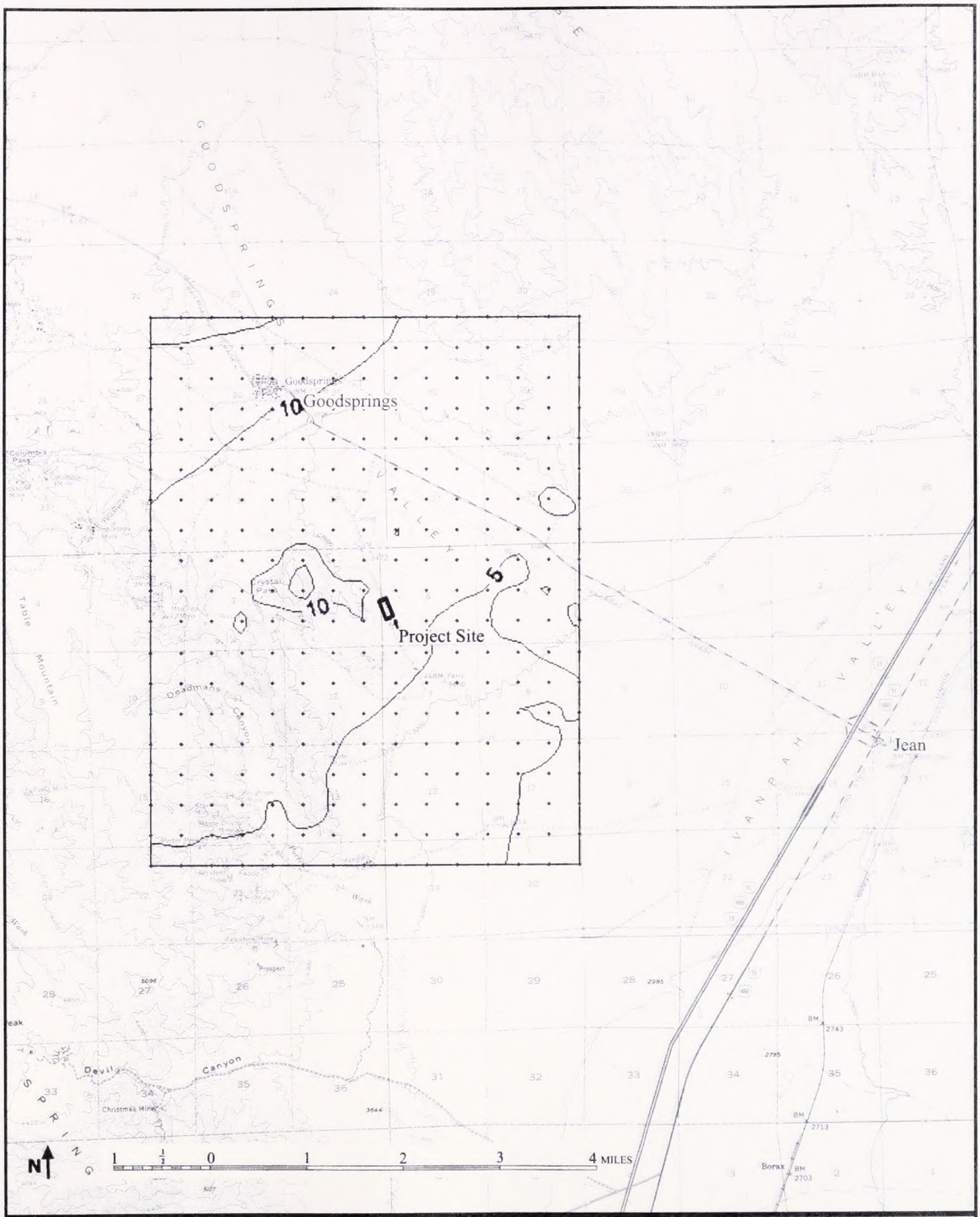
FIGURE 5-23
Annual PM_{10} Impacts – PSD Increment



PARSONS

IVANPAH ENERGY CENTER PROJECT

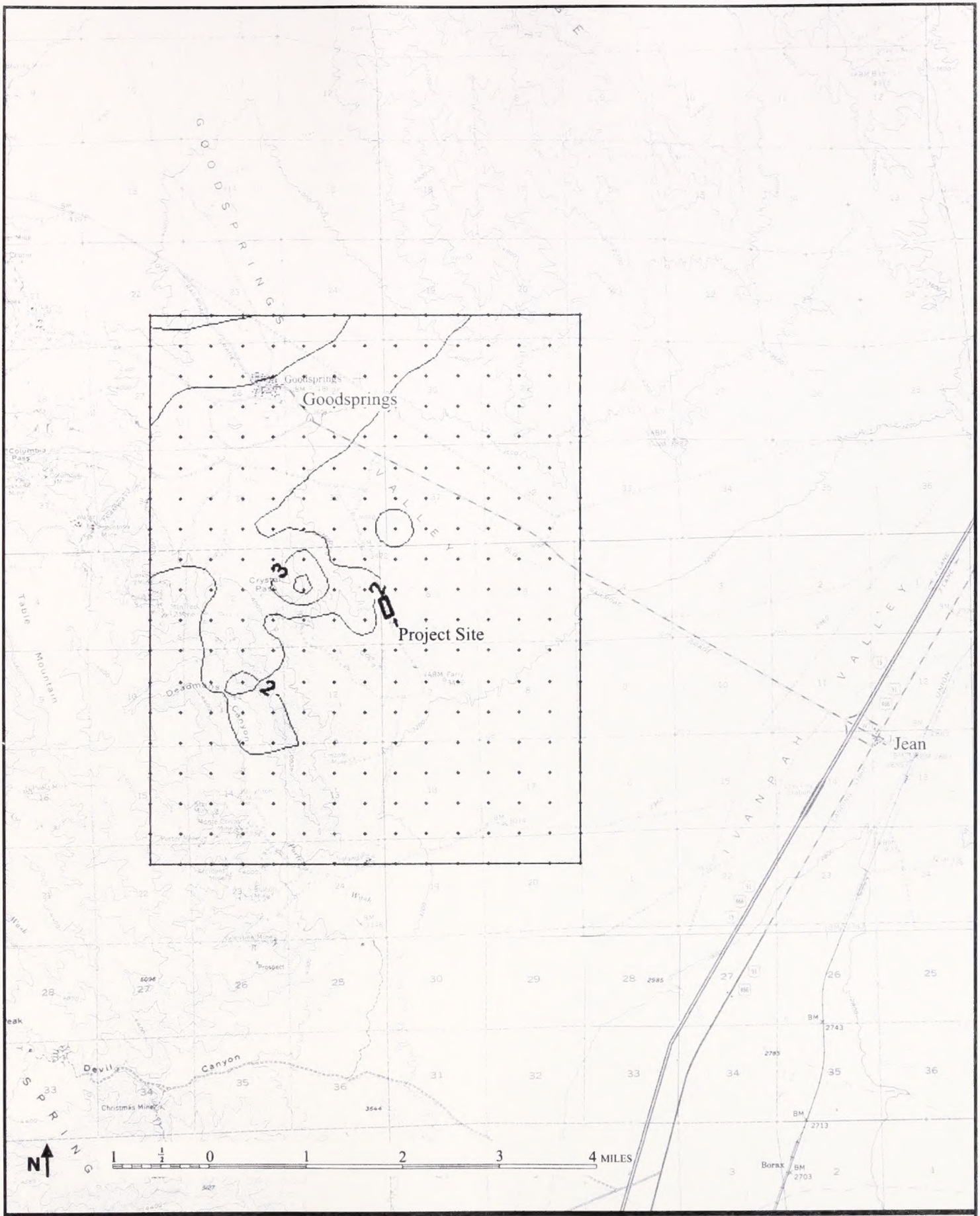
FIGURE 5-24
Annual NO_2 Impacts – All Sources



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IVANPAH ENERGY CENTER PROJECT

FIGURE 5-25
24-Hour PM_{10} Impacts – All Sources



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FIGURE 5-26
Annual PM_{10} Impacts – All Sources

SECTION 6
SUMMARY OF IMPACTS

The alternatives analysis resulted in retention of the Proposed Goodsprings Plant Site (Alternative E), the Primm Plant Site (Alternative F), and the No Action Alternative for further consideration.

The Proposed Goodsprings Plant Site would be located on a 30-acre parcel; an additional 10 acres would be used as a temporary laydown area. Natural gas supply to the plant would be from the KRGT pipeline which is adjacent to the plant site. Development of the site also would require improvements to the permanent northern access road and temporary southern access road and installation of a telecommunications line. The plant site, temporary laydown area, access roads, and telecommunications line would be on BLM property.

The Primm Plant Site would be co-located on industrial-use private land, with the Reliant Bighorn Generating Facility. Existing access roads and telecommunications right-of-way would be used; however, a 3.2-mile-long natural gas supply pipeline and a metering station would be required on BLM land.

Regardless of plant site location, a water treatment plant that would be constructed on one of two 0.7-acre parcels near the Southern Nevada Correctional Center in Jean. The parcels are located north of Prison Road.

A water supply pipeline to the Goodsprings Plant Site would largely parallel the UPRR to the BLM-designated Utility Corridor that would be used to interconnect the power plant to Mead Substation. The pipeline would be co-located within the transmission line corridor to the vicinity of the Goodsprings Site. Three plant site access options were evaluated to route the pipeline from the transmission line corridor to the plant site. Two routes would extend south of a small mountain near the plant site, one route would cross over the mountain.

Two water supply pipeline routes were evaluated for the Primm Plant Site. One route would extend directly from the water treatment plant to the plant site, parallel to the UPRR ROW. The other route would parallel the UPRR to the previously referenced utility corridor where it would be co-located within the project transmission line corridor to the plant site.

Development of either the Goodsprings Plant Site or the Primm Plant Site would require interconnections with Mead Substation and Table Mountain Substation.

Two alternative routes were evaluated for a single-circuit transmission line from the Goodsprings Plant Site to Mead Substation (Ivanpah-Mead #2). A double-circuit line also would be required from the plant site to Table Mountain Substation (Ivanpah-Table Mountain #1 & #2). Lines also would interconnect to the existing Pahrump-Mead Transmission Line.

Four Goodsprings Plant Site access options were identified to interconnect the previously referenced five circuits to the Ivanpah Energy Center, Mead Substation, Table Mountain Substation, and the existing Pahrump-Mead Transmission Line. One access option would cross over the mountain west of the plant site, two access options would extend all five

circuits around or across the southern toe of the mountain. One access option would extend one circuit across the mountain and four circuits across or around the toe of the mountain.

Development of the Primm Plant Site would require construction of a circuit to Mead Substation (Ivanpah-Mead Transmission Line) and one circuit to Table Mountain Substation (Ivanpah-Table Mountain Transmission Line). Four alternative routes were evaluated to interconnect the Ivanpah Energy Center to the two substations.

Selection of the No Action Alternative would result in a failure to develop new generating capacity in Southern Clark County. Under such circumstances, the region would continue to be reliant on existing and planned generation and the purpose and need for the Ivanpah Energy Center would not be met.

Alternatives and options that were evaluated in detail are summarized in Table 6-1.

Comparative Summary of Impacts

Geology and Soils

Impacts to geology and soils that would be related to construction and operation of the Ivanpah Energy Center would be similar and negligible, regardless of alternative plant site selected. Use of the Goodsprings Site would eliminate mining potential on approximately 42 acres; whereas use of the Primm Site would eliminate mining potential on 9 acres., Transmission line construction related to the Goodsprings Plant Site would cross 40,000 linear feet of mining claims (regardless of transmission line alternative); those associated with the Primm Plant Site would cross 54,000 to 56,000 linear feet of mining claims.

Erosion potential that would be associated with plant access option would only be associated with development of the Goodsprings Plant Site. Those access options that would cross the mountain west of the Goodsprings Plant Site (Options 1 and 4) would result in greater potential impacts than those that would cross south of the mountain (Options 2 and 3).

Mitigation measures that would be implemented to reduce the severity of erosion include the installation of appropriate drainage structures (i.e., gabions) and regrading and revegetation of disturbed areas. Those that could be taken to reduce impacts to mining operations include modifications to transmission line structure locations, spanning of mining areas, and negotiations with mining operators.

Impacts to geology, soils, and mining are expected to be less than significant, regardless of plant site alternative.

Groundwater and Surface Water

Ivanpah Energy Center (regardless of plant site location) would operate using a dry cooled system and refrigerated input air that would minimize process water requirements. Water that would be needed for plant operations would be acquired from gray water flows from the Southern Nevada Correctional Center.

Groundwater would only be required as a supplement to the use of gray water. A well that is located near the SNCC has been proposed for use by the project proponent, should gray water flows from the SNCC be curtailed. The use of refrigerated air technology and gray water

would reduce groundwater dependence, thus resulting in less than significant impacts to the resource.

Biological Resources

Construction and operation of the Ivanpah Energy Center at the Proposed Goodsprings Plant Site would result in significant impacts to approximately 115 acres of moderate density (Category B) desert tortoise habitat. Approximately 36 acres would be permanently affected during the life of the project; 79 acres would be temporarily affected. An additional 222 acres that are located in low density (Category C) desert tortoise habitat would be moderately impacted as a result of facilities construction and operation.

Construction and operation of the Ivanpah Energy Center at the Primm Plant Site (Primm Plant Site Alternative) would result in significant impacts to approximately 27 acres of moderate density (Category B) desert tortoise habitat. Less than one acre would be permanently affected; approximately 26 acres would be temporary affected. An additional 340 acres (including 40 acres of industrial land at the Primm plant site) of low density (Category C) desert tortoise habitat would be moderately impacted as a result of facilities construction and operation.

Mitigation measures that would be taken to reduce impacts to Category B density areas include 100 percent clearing, extensive monitoring during construction, and permanent fencing of all permanent project site lands (including the northern access road). Mitigation required for Category C density areas are less stringent than those of Category B, but include on-site monitoring and other protective measures during construction. Stipulations for Category B and Category C density areas are provided in Appendix E.

Construction and operation of the Proposed Goodsprings Plant Site would permanently impact *Penstemon spp.* habitat (primarily due to construction of the northern access road), which would result in moderate impacts to the species. Additional moderate impacts would result from temporary impacts to *Penstemon spp.* habitat that would be primarily attributable to access road construction, water supply pipeline installation, and transmission line construction. Transmission lines that would be associated with development and operation of the Primm Plant Site Alternative would temporarily impact *Penstemon spp.* habitat, thus resulting in a moderate impact to the species. The temporary impacts would be primarily due to transmission line construction. Permanent impacts to the species that would be related to the Primm Plant Site Alternative are not expected. Impacts to the species would be mitigated to the extent practicable (regardless of alternative selected) through avoidance, site restoration, and reseeding. Stipulations that are applicable to the species are provided in Appendix E.

Construction of transmission lines that are related to the Proposed Goodsprings Plant Site would cross approximately 13,000 linear feet of crucial Gambel's quail habitat and result in moderate temporary impacts to the species. Similar moderate impacts to the species would result from approximately 26,000 linear feet that would be crossed by Primm Plant Site Alternative transmission lines. Approximately 21,000 linear feet of crucial desert tortoise habitat would be crossed by transmission lines. Impacts to other species

of concern were considered to range from negligible to moderate, regardless of plant site alternative. Impacts to the species would be reduced by using existing roads along transmission line corridors, minimizing the access road construction (to the extent practicable), and scheduling to avoid construction during the nesting and desert bighorn sheep lambing seasons.

Potential impacts to other species of concern are expected to range from negligible to moderate, regardless of plant site alternative. The severity of impacts to other species of concern would be minimized through the use of existing access roads along transmission line corridors and minimizing construction of new access roads, to the extent practicable.

Cultural and Paleontology

Class I cultural and paleontological data indicate that several sites of potential interest are within the project area. Field investigations will be conducted as part of the project to identify potential impacts and mitigation measures associated with the project.

Table 6-1. Summary of Alternatives Retained for Further Consideration

Project Component	Proposed Goodsprings Plant Site	Primm Plant Site Alternative
IEC Plant Site Location Alternatives	Alternative E— Proposed Goodsprings Plant Site	Alternative F – Primm Plant Site (co-location with Reliant Bighorn)
Natural Gas Pipeline	Direct connection to plant site. No routing required.	3.2-mile-long pipeline from KRGT and 0.46 acre metering station.
Telecommunications Line	Installation along a 7,200-foot-long corridor from the KRGT Compressor Station to the plant.	Installation along the existing Sprint Communications line in use by Reliant. No routing required
Access Roads	Northern Access (County Road 53Y), 20-foot-wide, paved, 3-foot-wide shoulders.	Access available on paved road through the Bighorn facility.
	Southern Access (County Road 28, existing trail, and County Road 53Y). Trail bladed to 18-foot-width.	
Water Treatment Facility	Use of one of two 0.7-acre parcels north of Prison Road.	
Water Supply Pipeline Route	South from SNCC along the west side of the UPRR ROW to and within BLM-designated Utility Corridor and Ivanpah-Mead Transmission Line #2 corridor.	Parallel to east side of the UPRR ROW to the plant site.
		Parallel to east side of the UPRR ROW to (and within) the Ivanpah-Mead/Ivanpah-Table Mountain Transmission Line corridor.
Water Supply Pipeline Plant Site Access Options	Across the mountain	N/A
	Traversing the southern slope of the mountain, north of Desert Tortoise fence.	
	Parallel to existing trail, around the southern toe of the mountain	
Transmission Line Alternatives	Alternatives C and E retained for further consideration.	Ivanpah-Mead—Four Alternatives Retained Ivanpah-Table Mountain –Two Alternatives Retained

Project Component	Proposed Goodsprings Plant Site	Primm Plant Site Alternative
Transmission Line Plant Site Access Options	Five circuits across the mountain	N/A
	Five circuits traversing the southern toe of the mountain, north of Desert Tortoise Fence	
	Five circuits parallel to an existing trail, around the toe of the mountain.	
	One circuit across the mountain, four circuits traversing the toe of the mountain	
Structure Type Options	Gray-painted single-pole tubular steel	
	Coreten single-pole tubular steel	
No Action Alternative	No Action Alternative Retained	

Land Use and Zoning

The Ivanpah Energy Center, Proposed Goodsprings Plant Site would be constructed on BLM land. Approximately 30 acres would be permanently (during life of the project) used for the facility and an additional 10 acres would be used as a temporary laydown area. Construction of the Primm Plant Site would be on private land. An additional 0.7 acres of State of Nevada land would be used for the water treatment plant, regardless of plant site alternative. Permanent and temporary land use requirements for BLM lands total 336 acres for the Proposed Goodsprings Alternative and 327 acres for the Primm Plant Site Alternative.

The water treatment plant would be located on State of Nevada land that is zoned as rural open space. Construction of the plant would require a special use permit from Clark County.

Impacts to land use and zoning would be negligible, regardless of alternative selected. The Goodsprings Plant Site would be located on leased public land and would require a zoning change to permit heavy industrial use. The Goodsprings Plant Site also will require variances and waivers for township/range line avoidance, height requirements, off-site development, county road abandonment, noise limitations, landscaping, and setback from non-industrial use areas.

The Primm Plant Site would be located on private land that is partially zoned for heavy industrial use. Eighty-five acres of the original 166 acres that are leased by Reliant Energy for the Bighorn facility have been zoned M-2 (heavy industrial). Although a portion of the original 85 acres may be available for use by Ivanpah Energy Center at Primm, it is likely that additional lands on the original 166-acre tract will require rezoning for heavy industrial use.

Development of the Primm Plant Site would require variances and waivers for height requirements, off-site development, noise limitations, setback from non-industrial use areas, and landscaping.

The Primm Site is currently under lease by Reliant Energy from Primadonna Corporation. According to Reliant Energy (Greesom, 2002), the current lease allows an unspecified amount of additional electrical generation to be constructed on the leased lands; however, contractual arrangements between Reliant Energy and Diamond Generating Corporation would need to be negotiated.

Rangeland Management

Although impacts to rangeland are not expected to be significant, regardless of plant site alternative, those related to the Primm Plant Site Alternative would be slightly greater than those related to the Proposed Goodsprings Plant Site. Potential impacts associated with both alternatives include the potential introduction of noxious weeds; injury to, or loss of livestock during construction; damage to fences, gates, and cattle guards that could occur during construction; and reduced access to water and feed supplies during construction. Mitigation measures that are applicable to reduce impacts to rangelands and grazing are provided in Appendix E.

Recreation

Impacts to recreation are not expected to be significant, regardless of plant site, transmission line route, or water supply pipeline route selected. However, they would be slightly greater for the Primm Site Alternative because transmission line construction through recreation-use lands would be more extensive than would be needed to support development and operation of the Proposed Goodsprings Alternative. Regardless of alternative selected, potential impacts related to off-road events and casual users could be reduced by appropriate scheduling and the identification of work site locations.

Transportation

Construction of the Goodsprings Plant Site could result in greater impacts to highway safety than that of the Primm Plant Site, primarily because plant site construction and operation would affect traffic on SR 161. However, due largely to the inclusion of the temporary (south) access road, the level of impacts that would be associated with the Proposed Goodsprings Alternative are not expected to be significant.

Hazardous Materials

Ivanpah Energy Center (regardless of plant site location) would be constructed and operated in a manner that would avoid the release of hazardous and non-hazardous materials. The project proponent has agreed to use aqueous ammonia (concentrations of less than 20 percent), rather than hydrous ammonia. Therefore, impacts associated with hazardous or non-hazardous materials are not expected to be significant, regardless of alternative selected.

Visual Resources

Construction and operation of either the Goodsprings or the Primm Plant Site are expected to result in weak to moderate visual impacts. The Goodsprings plant site would be screened from most views by intervening topography; the Primm plant site would be partially screened by the Reliant Bighorn Generating Facility. Slightly greater visual impacts would be associated with Goodsprings Plant Site Transmission Line Access Options 1 or 4 than would result from Options 2 or 3 because land disturbance and structures on the mountain west of the plant site would be more readily visible. Potential impacts associated with new transmission lines would be mitigated through the use of gray-painted structures and non-specular conductor and (to the extent practicable) by paralleling existing transmission lines and structures.

Climate and Air Quality

Construction at the Proposed Goodsprings Site or the Primm Site would generate similar levels of airborne particulates during site clearance and road construction. However, since more site preparation and access road grading would be needed for the Goodsprings Plant Site than would be needed for the Primm Plant Site Alternative, related temporary impacts that would be associated with the Goodsprings Plant Site would be greater than those associated with the Primm Site Alternative. Impacts to air quality due to plant operations are not expected to be significant, regardless of plant site selected.

Noise

Clark County noise standards are not expected to be violated, regardless of plant site selected and impacts to area residents are expected to be less than significant. However, due to the proximity of the site to sensitive receptors (2.3 miles), it is likely that temporary noise impacts related to construction of the Proposed Goodsprings Plant Site would be slightly greater than those related to the Primm Plant Site Alternative.

Socioeconomics/Environmental Justice

Construction and operation of the Ivanpah Energy Center would result in similar negligible impacts to area residents and Clark County, regardless of plant site location. Environmental Justice issues are not present at either alternative or their auxiliary components.

Land disturbance acreages that are associated with the Goodsprings and Primm plant site alternatives are shown on Tables 6-2 and 6-3, respectively.

Transmission Line Engineering and Cost Considerations

An engineering analysis was provided by Electrical Consultants, Inc. (ECI) (Broveak, 2002) to compare reliability, constructability, cost, and maintenance factors that are related to transmission lines required to serve the Proposed Goodsprings Plant Site and those required to serve the Primm Site Alternative. Results of the analysis are as follows:

Reliability

Valley Electric Association's (VEA) existing Pahrump-Mead 230 kV transmission line does experience a few storm-related faults annually. According to fault locating capabilities of solid-state relaying, the majority of these weather-related outages occur within the McCullough Mountain Range, east of both plant site options. Consequently, the likelihood of a transmission outage requiring a short-term curtailment or transfer-tripping of generation to maintain transmission system reliability is to be expected. Given that the Goodsprings Plant Site's proximity to the existing Pahrump-Mead line corridor facilitates easy interconnection into VEA's Pahrump-Mead Line, transfer-tripping and curtailment of generation will be via direct wired electrical interconnections. Conversely, the Primm Plant Site Alternative would rely heavily on communications assisted schemes for generation shedding. Therefore, there is justification for the Goodsprings Plant Site as a more reliable plant location.

Furthermore, the Proposed Goodsprings Plant Site would interconnect with the transmission grid through three 230 kV lines (circuits) on two separate transmission structures, whereas the Primm Plant Site Alternative would interconnect to the transmission grid through two lines (circuits) on the same structure. Consequently, the possibility of a single contingency resulting in an outage on all interconnected lines is substantially higher for the Primm Plant Site Alternative than that of the Goodsprings Alternative. Although uncommon, a single lightning strike or structure failure on the double circuit line interconnecting into the Primm Plant Site would result in complete loss of the 500 MW generating output capability of the Ivanpah Energy Center.

Constructability

Construction of the Ivanpah Energy Center at the Primm Plant Site would be less difficult than that of the Goodsprings Plant Site, primarily due to the presence of existing access roads.

Essentially all transmission lines that would be required to support both plant site locations follow previously established transmission corridors. Therefore, constructability issues associated with the transmission lines are simply a discussion of line lengths. Upon review of the total line lengths associated with each option, ECI determined that transmission lines associated with the Goodsprings Plant Site would be marginally more constructible.

Construction Cost

From a construction cost standpoint, preliminary estimates indicate construction costs for a single-circuit 230 kV, bundled 954 kCM ACSR conductor with OPGW shield wire would be approximately $320,000 per mile and a double-circuit line would cost approximately $425,000 per mile. This yields an approximate cost for transmission facilities associated with the Goodsprings Plant Site of $16,097,500 and approximately $18,109,500 for the Primm Plant Site. Consequently, as a direct result of the additional line miles associated with the Primm Site, the Goodsprings Plant Site is a more cost effective option.

Maintenance Considerations

From a line maintenance perspective, the Proposed Goodsprings Plant Site is somewhat better due to the fact that all new lines would be within 1 mile of existing VEA line corridors. Construction of the Ivanpah Energy Center at the Primm Site would introduce approximately 7.9 miles of new VEA line corridors. However, regardless of plant site location, the use of steel pole construction would minimize maintenance requirements.

Table 6-2 Areas of Disturbance by Project Component – Proposed Goodsprings Plant Site

Goodsprings Site – includes Option 2 across toe of mountain and line to Table Mountain						
	BLM ROW	Land Disturbance Within BLM ROW		Land Disturbance Outside of BLM ROW		Private and State Lands
		Permanent	Temporary	Permanent	Temporary	
Ivanpah Energy Center						
Plant Site (N-75493)	30.0	30.0				
Temporary Laydown Area (N-75493)	10.0		10.0			
Natural Gas Supply Pipeline (N-75471)	Negligible	Negligible	Negligible			
Telecommunications Line (N-75895) [1]	1.7		0.8			
Access Roads (N-75493)						
Northern Access Road (County Road 53Y) [2]				2.7		
Southern Access Road [3]					2.6	
Water Treatment Plant (no BLM permit required)	State of Nevada Land					0.7
Water Supply Pipeline (N-75475)						
Parallel to UPRR ROW and Co-located with Transmission Corridor (~57,560 linear ft)	13.2 [4]		52.9 [5]			
Ivanpah-Mead #2, Ivanpah-Table Mountain #1 & #2, and Pahrump-Mead Interconnections (N-75471 and N-75472)						
Approx. Line Length (~251,000 linear ft)						
Pole Sites (380)		<0.1				
Pole Work Areas (100x200 each)			174.5			
P&T Sites			2.8 [6]		27.6 [7]	
New Access Roads		4.8 [8]				
Spur Roads		4.1 [9]			5.2 [10]	
OPGW	69.2 [11]					
Temp. Laydown Areas (total)					18.0	
Total Proposed Goodsprings Site		**38.9**	**241.0**	**2.7**	**53.4**	**0.7**

(1) Total length - 7,200 linear ft -- 10 ft wide permanent ROW, 25 ft temporary disturbance along 1,400 linear feet.
(2) 7,500 linear ft – increase from 10 ft wide to 26 ft wide, pave 20 ft. width.
(3) 14,000 linear ft – increase from 10 ft side to 18 ft wide.
(4) 10 ft wide permanent ROW, partially within project transmission line corridors,
(5) 40 ft wide temporary disturbance
(6) 4 sites within ROW, (100x300 each)
(7) 40 sites outside of ROW, (100x300 each)
(8) 5,000 linear feet x 18 ft, from Table Mountain Sub. to Mead Sub. (2.1 ac), plus 6,500 linear feet x 18 ft, across toe of mountain (2.7 ac)
(9) 10,000 linear feet (spur roads) x 18 ft (4.1 ac)
(10) 12,500 linear feet (spur roads) x 18 ft from Table Mountain Sub. to Mead Sub. (5.2 ac)
(11) OPGW = 12 ft wide throughout length of ROW
Note: Linear feet and acreages among transmission line alternatives and plant access options differ slightly.

Table 6-3 Areas of Disturbance by Project Component – Primm Plant Site Alternative

Primm Site – Includes to Table Mountain Circuit						
	BLM ROW	Land Disturbance Within BLM ROW		Land Disturbance Outside of BLM ROW		Private and State Lands
		Permanent	Temporary	Permanent	Temporary	
Ivanpah Energy Center						
Plant Site (N-75493)	Private Industrial Land					30.0
Temporary Laydown Area (N-75493)	Private Industrial Land					10.0
Natural Gas Supply Pipeline (N-75471)	4.4 (1)	0.5 (2)	19.4 (3)			
Telecommunications Line (N-75895)	None required					
Access Roads (N-75493)	None required					
Water Treatment Plant (no BLM permit required)	State of Nevada Land					0.7
Water Supply Pipeline (N-75475)						
Parallel to UPRR ROW (~57,800 linear ft)	13.3 (4)		53.1 (5)			
Ivanpah-Mead and Ivanpah-Table Mountain Circuits (N-75471 and N-75472)						
Approx. Line Length (~285,900 linear ft)						
Pole Sites (410)		<0.1				
Pole Work Areas (100x200 each)			188.3			
P&T Sites			3.4(6)		30.3(7)	
New Access Roads		4.2(8)				
Spur Roads		4.1(9)			5.2(10)	
OPGW	78.8(11)					
Temp. Laydown Areas (total)					18.0	
Total Primm Site Alternative		**8.8**	**264.2**	**- 0 -**	**53.5**	**40.7**

(1) 0.5 ac metering station plus 3.9 ac permanent pipeline ROW (10 ft width)
(2) 100 x 200 ft metering station
(3) 16,900 linear ft pipeline, 50 ft wide temporary disturbance
(4) 10 ft wide permanent ROW
(5) 40 ft wide temporary disturbance (an alternative using transmission line corridors would result in 66 acres of disturbance).
(6) 5 sites within ROW, (100x300 each)
(7) 44 sites outside of ROW, (100x300 each)
(8) 5,000 linear feet x 18 ft, from Table Mountain Sub. to Mead Sub.(2.1 ac), plus 5,000 linear feet x 18 ft from IEC to the north (2.1 ac)
(9) 10,000 linear ft (spur roads) x 18 ft (4.1 ac)
(10) 12,500 linear feet x 18 ft from Table Mountain Sub. to Mead Sub. (5.2 ac)
(11) OPGW = 12 ft wide throughout length of ROW
Note: Linear feet and acreages among transmission line and water supply pipeline alternatives options differ slightly.

6.1 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Construction and operation of the Ivanpah Energy Center would result in significant impacts to the desert tortoise. Construction of the Proposed Goodsprings Plant Site, the telecommunications line, access roads, water supply pipeline, and transmission lines would result in the permanent loss of approximately 36 acres of Category B desert tortoise density lands. An additional 79 acres would be significantly affected during construction and prior to completion of restoration practices.

Construction and operation of the Ivanpah Energy Center at the Primm Plant Site would result in significant impacts due to the permanent loss of less than one acre of Category B desert tortoise density lands. Additional significant impacts would result from temporary impacts to approximately 27 acres of Category B desert tortoise density lands.

The decision to identify impacts within Category B habitat as "significant" was made based on species density and a higher potential for project actions to affect greater numbers of desert tortoise than would be affected by actions in lower density areas. Species density within the category typically exceed 45 per square mile, whereas those within Category C density areas are below 45 per square mile. Category B lands, as designated by the BLM (1997), include the area west of I-15 from the vicinity of Jean to the southern limit of the Desert Tortoise Translocation Area and lands east and west of the interstate north of Jean.

Results of biological investigations that were carried out for the Ivanpah Energy Center EIS confirm relatively high densities of the species to be present along the northern and southern access roads to the plant site, land surrounding the plant site, and along transmission line corridors west of I-15 as discussed in Section 5.1.3. Additional information, contained in the Draft Biological Assessment (refer to Appendix F) indicates that moderate (45 – 90 per square mile) to very high (140+ per square mile) densities were found to be present within all but one area west of I-15. Densities east of the interstate, including Eldorado Valley, ranged from very low (0 – 10 per square mile) to low (10 – 45 per square mile) in all but one area.

Project activities within moderate to high density desert tortoise habitat were considered to result in significant impacts to the species because actions within those areas (Category B) are more likely to directly or indirectly affect greater numbers of the species than similar actions within very low to low density habitat. The range of impacts include incidental take during construction or operation due to crushing or similar direct action, habitat fragmentation, introduction of noxious or other undesirable plant species, soil compaction and similar habitat degradation, and the potential for increased public access to area lands.

Direct long-term habitat loss associated with construction and operation of the Ivanpah Energy Center and north access road at the Goodsprings Plant Site and potential increased public access to the

area south of the plant site represent significant unavoidable impacts that cannot mitigated. Short-term and long-term unavoidable impacts that can be (at least partially) mitigated include construction of the south access road, land disturbance due to water supply pipeline and telecommunications line installation, and transmission line installation. The range of mitigation measures include site restoration and revegetation and noxious weed controls.

Mitigation measures that would be used to minimize impacts to the species are provided in Appendix E.

6.2 CUMULATIVE IMPACTS

The National Environmental Policy Act requires the identification and consideration of incremental impacts that are related to the proposed action when added to other past, present and reasonably foreseeable actions (40 CFR 1508.7). Consideration of such impacts is necessarily broad and includes on-site and off-site public and private actions that would be directly or indirectly related to the proposed action.

Cumulative impacts that would be associated with the Ivanpah Energy Center were limited to the Ivanpah Valley and Eldorado Valley of southern Clark County, Nevada. Those activities include previous, present, and probable future developments within the two valleys. Short-term impacts are associated with facilities construction; long-term impacts relate to the life of the project (at least 30 years).

6.2.1 Current Setting

Ivanpah and Eldorado valleys have been previously impacted by a variety of activities ranging from the construction and continued use of major highways and secondary roads, unimproved roads and trails, pipelines, the Union Pacific Railroad, casinos and retail businesses, transmission lines and substations, and other facilities developed around Jean and Primm. Development within the area has resulted in the loss of natural resources and the transition of both valleys from their original undisturbed natural setting to one that, in many locations, represents an industrial or commercial setting. Similar changes have taken place in limited areas of the McCullough Range where roads and trails provide access through narrow passes that also are crossed by high voltage transmission lines. As described in Chapter 4, nearly all areas that would be affected by development and operation of the IEC facility have been previously impacted by development.

6.2.2 Reasonable and Foreseeable Future Actions

Ivanpah Valley has become a focus for new development in the southern Clark County area. Its proximity to the City of Las Vegas and the Nevada/California state line, the availability of land, and the availability of I-15 have contributed to the development of retail and casino operations in Jean and Primm. Conversely, development within the Eldorado Valley is limited by the City of Boulder City as a result of a 1994 Interlocal Agreement with Clark County (1994). Development within the valley has been limited to high voltage transmission lines, substations, the Reliant-Sempra El Dorado Power Plant, and mining activities.

Reasonable and foreseeable future actions that could contribute to cumulative impacts within Ivanpah Valley and Eldorado

Valley that are related to the proposed action include:

Ivanpah Valley

- Clark County Conservation of Public Lands and Natural Resources Act of 2002
- Kern River Gas Transmission Expansion Project
- Sempra Energy Natural Gas Supply Pipeline Project
- Table Mountain Wind Energy Project
- Ivanpah Valley Airport Development
- Las Vegas Valley Water District Pipeline
- Widening of I-15 and Sandy Valley Road
- Las Vegas – Southern California Maglev System
- Reliant Bighorn Generating Facility
- AT&T Fiber-optic Line

Eldorado Valley

- Widening of U.S. 95
- City of Boulder City Bypass

Clark County Conservation of Public Lands and Natural Resources Act of 2002

Passage of the Clark County Conservation of Public Lands and Natural Resources Act of 2002 by the United States Senate (Senate Bill 2612) includes measures that are applicable to the Ivanpah Valley. The bill addresses the management of public lands along the Interstate 15 corridor from southern Las Vegas to the Nevada/ California State Line and includes the establishment of a 2,640-foot wide corridor "... between the Las Vegas Valley and the proposed Ivanpah Airport for the placement, on a nonexclusive basis, of utilities and transportation." Lands that would be transferred to Clark County for development of the Ivanpah Airport can be subsequently sold, leased, or otherwise conveyed (subject to limitations) by Clark County to a third party. The bill signed into law by President George W. Bush during November 2002.

The location of the proposed Ivanpah Airport and surrounding lands that have been designated as a noise compatibility area for the airport are shown on Figure 6-1. The location of the 2,640-foot-wide utility corridor has not been determined, and therefore, is not shown on the map. Although plans have not been finalized regarding airport development, it is assumed that airport facilities will occupy essentially all of the 6,000 designated acres. Lands that have been designated for noise compatibility uses could remain in their current use, which includes grazing, or could be developed for business, industrial, warehousing, or similar noise compatible use. The Proposed Goodsprings Plant Site is not within the designated noise compatibility area, whereas the Primm Plant Site is within the compatible use area.

Kern River Gas Transmission Expansion Project

The Kern River Gas Transmission pipeline is west of I-15, in the western portion of Ivanpah Valley. Information provided by Tim Powell of Williams Companies (Powell 2002) indicates that the project is on schedule; construction along some

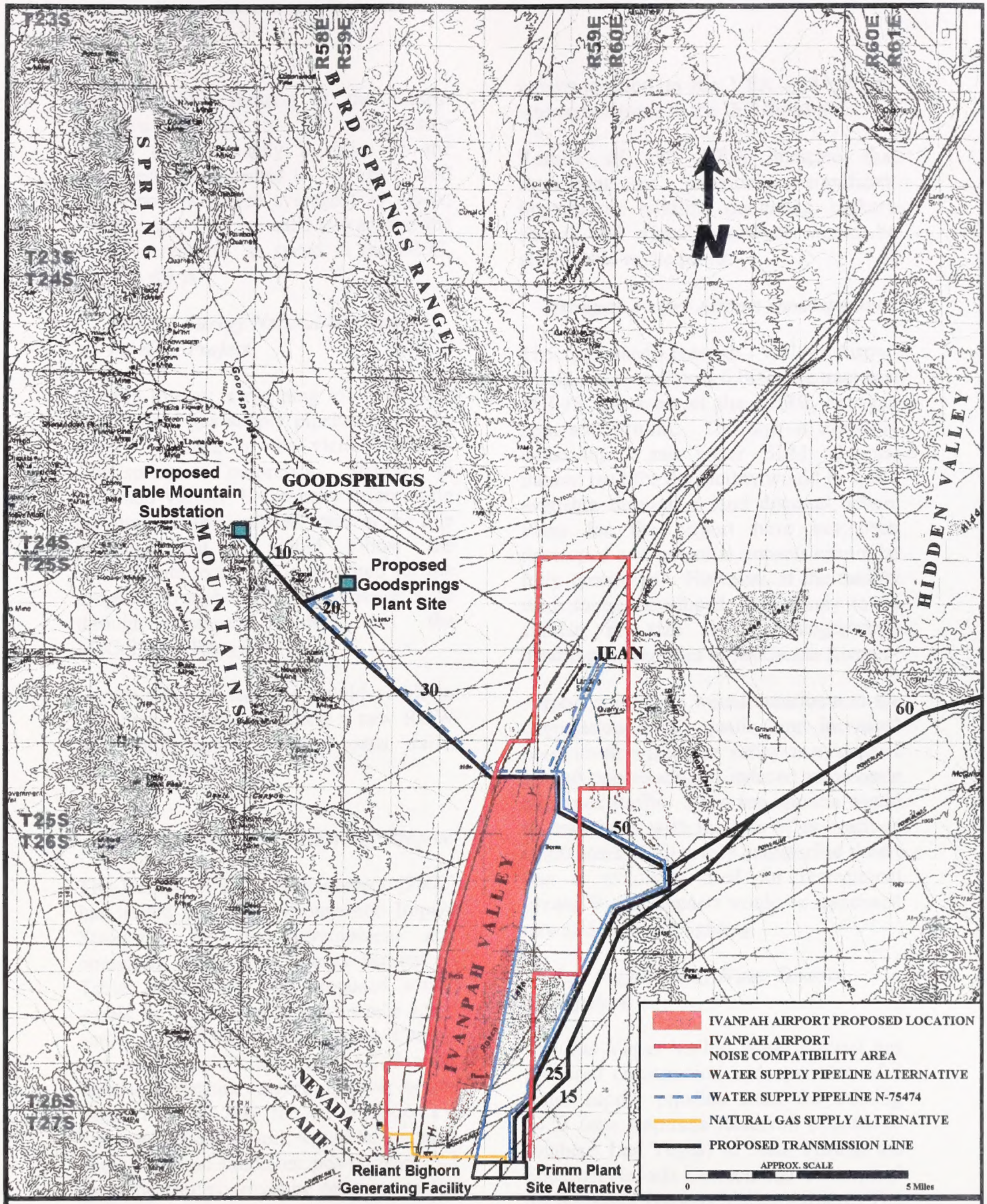
segments of the pipeline corridor began during the fall 2002. A Final Environmental Impact Statement has been prepared and issued by the Federal Energy Regulatory Commission (FERC) and the California State Lands Commission (CSLC).

The KRGT expansion project would include construction and operation of about 635 miles of 36-inch-diameter pipeline, 82 miles of 42-inch-diameter pipeline, less than one mile of 12-inch-diameter pipeline, three new compressor stations, expansion of six existing compressor stations, and modifications to five existing meter stations. System improvements in the Goodsprings area includes proposed modifications to an existing 15,000 horsepower gas turbine compressor and the installation of two new compressors, each rated at 15,000 horsepower. An additional 36-inch-diameter pipeline also would be installed in the Goodsprings area. Based on information provided in the DEIS (FERC and CSLC, 2002), improvements and expansion of the system in the Goodsprings area would not result in significant environmental impacts. Operation of two new 15,000 horsepower compressors are expected to result in the following emissions (Table 6-4):

Table 6-4 KRGT Emissions Associated With Two New 15,000 Hp Compressors

Unit	NO_x		CO		VOC		SO_2		PM_{10}	
	Lb/hr	Tpy	Lb/hr	Tpy	Lb/hr	Tpy	Lb/hr	Tpy	Lb/hr	Tpy
Additional Turbines	19.45	85.20	4.50	19.72	6.78	29.71	0.66	2.91	1.30	5.65
Existing Turbines	---	45.84	---	10.37	---	13.87	---	1.37	---	2.72
Total	---	131.04	---	30.09	---	43.58	---	4.28	---	8.37
Net Increase	---	85.20	---	19.72	---	29.71	---	2.91	---	5.65

NO_x	nitrogen oxides (includes nitric oxide and nitrogen dioxide)
CO	carbon monoxide
VOC	volatile organic compounds
SO_2	sulfur dioxide
PM_{10}	particulate matter, less than 10 microns in diameter
lb/hr	pounds per hour
tpy	tons per year



PARSONS

IVANPAH ENERGY CENTER PROJECT

FIGURE 6-1
CLARK COUNTY CONSERVATION AND NATURAL RESOURCES ACT OF 2002

Potential noise impacts at the closest sensitive receptor to the compressor facility (approximately 2 miles to the northwest) are expected to average (based on 24 hour weighted averages) 35 dB-A; existing day-night adjusted averages at the sensitive receptor, as stated in the DEIS, are 32.4 dB-A.

Sempra Energy Natural Gas Supply Pipeline Project

Sempra Energy is planning to construct a new natural gas supply pipeline from the KRGT pipeline, in the vicinity of the Goodsprings Compressor Station to Eldorado Valley. Preliminary information pertaining to the intended route of the line indicates that it would follow the approximate route that is proposed for the proposed Ivanph-Mead Transmission Line through Ivanpah Valley and the McCullough Range.

Construction of the line would result in temporary disturbance along a new ROW that would parallel existing roads, trails, and transmission lines.

Table Mountain Wind Energy Project

The Bureau of Land Management (2002) has issued a Draft Environmental Impact Statement for the development and operation of the wind energy facility on Table Mountain. The proposed action would be located on approximately 4,500 acres, west of the Ivanpah Energy Center, and would include an array of 153 wind turbine generators ranging in tower height from 140 to 290 feet. A 34.5 kV interconnection network would be installed using overhead structures; power generated from the facility would be delivered to the proposed Table Mountain Substation for interconnection to the VEA grid through interconnections to the IEC Substation.

Results of the DEIS indicate that significant or potentially significant impacts to wildlife (including bighorn sheep) and visual resources would be attributable to the project.

Ivanpah Valley Airport Development

The proposed Ivanpah Valley Airport would be located on a 6,000-acre tract east of I-15 and west of the UPRR, between Jean and Primm. The area is currently undeveloped and under BLM administration; land for the facility would be made available through a land disposal action. Plans for the airport have not been developed and potential impacts cannot be fully quantified. However, if the facility were to be developed, it is likely to be similar in size and passenger/cargo handling capabilities as McCarran Airport.

Airport operations would contribute to the degradation of air quality and increased noise levels within the valley as a result of aircraft operations and induced automobile and truck traffic. Land use impacts would be associated with the loss of as much as 6,000 acres of relatively undisturbed desert that is primarily used for recreational events. Visual impacts would be associated new facilities and lighting.

Las Vegas Valley Water District Pipeline

The Las Vegas Valley Water District has proposed construction and operation of a water supply pipeline from the existing 2420 Zone Bermuda Reservoir (located in southern Las Vegas) to Jean, Primm, the Southern Nevada Correctional Center, and the proposed Ivanpah Valley Airport. The pipeline also would provide water to other

users along the I-15 corridor and within the valley in general. The project includes more than 30 miles of large-diameter pipeline, three pump stations, two reservoirs, and associated facilities such as access roads, electric power distribution lines, and telemetry control structures (BLM, 2002).

Although direct impacts associated with the pipeline are likely to be minimal, the availability of a reliable water source in Ivanpah Valley would likely result in increased development within the valley and secondary impacts as a result of such development.

Widening of I-15 and Sandy Valley Road

Nevada Department of Transportation is in the process of widening I-15 between the Nevada/California state line to the vicinity of Sloan. Widening is taking place in the median, leaving the existing two northbound and two southbound lanes in place for continued use. Clark County has determined that improvements to Sandy Valley Road are required to meet increasing growth in the area. Improvements to the existing road include an increase in highway ROW to a 200-foot-wide corridor.

Improvements associated with I-15 and Sandy Valley Road are likely to include additional noise levels due to higher vehicle speeds. However, due to the overall lack of sensitive receptors in the Goodsprings area, impacts to area residents are likely to be less than significant.

Las Vegas – Southern California Maglev System

The California Super Speed Train Commission and the American Magline Group have issued a project definition document describing a 300-mile per hour magnetic levitation (Maglev) system linking Las Vegas and southern California (BLM, 2002). The proposed alignment would be located almost entirely within the I-15 corridor and on some BLM lands within southern Clark County, including Ivanpah Valley. The trains would operate at a level of approximately 376 trains per week, 20 hours per day. Intermediate stops would include a commuter link between Las Vegas and Primm. Construction is scheduled to begin in 2003 and be completed by 2006.

Operation of the proposed maglev system would likely result in visual impacts within Ivanpah Valley as well land use impacts associated with induced growth in the vicinity of Primm. Potential beneficial economic impacts to the Goodsprings community could result from induced development within the valley. Adverse impacts to the community are likely to be minimal.

Reliant Bighorn Generating Facility

The Reliant Bighorn Generating facility is under construction, with completion scheduled for fall 2003. The generating facility would be much like the Ivanpah Energy Center and include two combined-cycle gas-fired turbine generators with a nominal output of 500 MW. As a combined cycle facility, exhaust heat would be routed to a heat recovery system to provide steam for a single steam-turbine generator. A new 230 kV transmission line from the facility was constructed to the Nevada Power Company Arden Substation. A portion of the Bighorn to Arden Transmission Line corridor parallels that which would be used by the Ivanpah Energy Center project. Reliant is

constructing a natural gas supply pipeline from KRGT to the plant site, a distance of approximately 3 miles.

An Environmental Assessment, completed for the project during the Fall 2001 indicated that impacts associated with its construction or operation would be minimal, and the BLM issued a Finding of No Significant Impacts for the project.

AT&T Fiber-optic Line

Preliminary information from AT&T indicates that an existing fiber-optic telecommunications line would be relocated from the east side of I-15 to the west side of the highway. Although the specific alignment has not been determined, the relocation would accommodate development of the proposed Ivanpah Valley Airport.

Construction of the relocated fiber-optic line is likely to result in temporary impacts to vegetation along the west side of I-15.

Widening of U.S. 95 (Eldorado Valley)

Nevada Department of Transportation is planning to widen U.S. 95 through Eldorado Valley. The widening would extend from U.S. 93 (Boulder Highway), near Railroad Pass, to the vicinity of Searchlight. Roadway width would be increased from two lanes to four lanes.

Although U.S. 95 crosses the proposed Ivanpah-Mead Transmission Line near the City of Boulder City, potential impacts associated with road improvements at the crossing location are not anticipated. However, specific design information would be required to determine structure locations and designs at the crossing location. Impacts related to highway improvements are likely to be limited to increased noise levels and land use changes. Most of the area that is crossed by the highway is under the jurisdiction of the City of Boulder City which prohibits commercial and residential development in the area.

City of Boulder City Bypass (Eldorado Valley)

Nevada Department of Transportation is planning to construct a new highway to bypass the City of Boulder City. Three construction (action) alternatives have been identified as part of a Draft Environmental Impact Statement, all of which would be located north of the proposed Ivanpah-Mead Transmission Line.

The new highway is likely to result in impacts to existing habitat and would create visual and noise impacts in the area. Most of the area that is crossed by the highway is under the jurisdiction of the City of Boulder City which prohibits commercial and residential development in the area.

6.2.3 Potential Cumulative Impacts by Resource Category

Cumulative Impacts to Geology and Minerals, Soils, Seismicity, and Mining

Construction and operation of the Ivanpah Valley Airport is likely to result in greater impacts to the availability of minerals and mining activities within the area than all other projects combined (including the Ivanpah Energy Center project). Minerals extraction and mining would be essentially precluded within a 6,000-acre area during the foreseeable future. Incremental impacts

to geology and minerals, soils, seismicity, and mining that would result from construction of the Ivanpah Energy Center at Goodsprings or at Primm would eliminate mining within permanently disturbed areas.

Ivanpah Energy Center would use approximately 3,300 million British Thermal Units per hour (Btu/hr) during full operating conditions. Following completion of expansion plans (scheduled for 2003), Kern River Gas Transmission Company transport capacity is expected to double its present capacity to total more than 1,700,000 dekatherms per day (70,830 dekatherms per hour). Therefore, maximum natural gas consumption at the Ivanpah Energy Center facility would total 4.7 percent of KRGT capacity.

Cumulative Impacts to Groundwater and Surface Water Resources

Development of the Ivanpah Energy Center (regardless of plant site location) would not affect surface waters, and therefore, not contribute to cumulative impacts to the resource. Groundwater availability is an issue in Ivanpah Valley, as well as many other areas of southern Nevada. Although development of the Ivanpah Energy Center (regardless of plant site location) would contribute to the cumulative effects of groundwater withdrawal and groundwater availability, the use of gray water from the SNCC and the application of a dry cooled, refrigerated air system would greatly reduce potential impacts to the resource. Requirements for groundwater would be further reduced by construction and operation of the proposed Las Vegas Valley Water District Pipeline which would provide water to existing and future development within Ivanpah Valley.

Cumulative Impacts to Biology

Construction and operation of the Ivanpah Energy Center would contribute to the loss of vegetation and wildlife resources within the Ivanpah Valley and Eldorado Valley.

Development within Ivanpah Valley has resulted in the loss of wildlife habitat due to construction, increased human presence, and recreational activities. Grazing, off-road recreational activities; and construction of transmission lines, facilities, and roads east of I-15 have contributed to the cumulative degradation of biological resources in the area. Project area lands west of I-15 have been less affected; however, the area has been previously impacted by construction of transmission lines, the KRGT pipeline and compressor station, and mining and other activities. Planned future actions, such as those that may occur as a result of the Clark County Conservation of Public Lands and Natural Resources Act of 2002, development of the Ivanpah Airport, KRGT expansion, are likely to result in far greater cumulative impacts to native species and species of concern than would result from the Ivanpah Energy Center, regardless of plant site location. Future development within the area is likely to transpose the valley from its present rural/urban mixture to a primarily urban setting. As urbanization occurs, native wildlife will be displaced by species that are more tolerant of urbanization.

Cumulative Impacts to Cultural and Paleontological Resources

The compendium of scientific knowledge of cultural and paleontological resources within the Ivanpah Valley is expanded as part of research conducted for essentially all projects within the area. Although

lands investigated as part of the Ivanpah Energy Center Project represent an incrementally small part of previously investigated areas or those that would be investigated as part of other foreseeable projects, they nevertheless, contribute to the overall database of knowledge in the area. Therefore, cumulative effects associated with the proposed action are believed to represent a negligible beneficial impact.

Cumulative Impacts to Land Use and Zoning

Ivanpah Valley has undergone and will continue to undergo extensive changes in land use patterns and zoning. Prior land use changes have resulted from construction and operation of the UPRR, highways and roadways, development within Goodsprings, Jean, and Primm. Additional land use and zoning changes are expected to occur as a direct result of the Table Mountain Wind Energy Project, the Ivanpah Valley Airport; indirect changes are expected to occur as a result of water availability and transportation improvements related to the Las Vegas Valley Water District pipeline, widening of I-15, and the Maglev Project.

Although the far-reaching ramifications of the passage of the Clark County Conservation of Public Lands and Natural Resources Act of 2002 cannot be fully determined, it provides an opportunity to substantially increase development along the I-15 corridor in Ivanpah Valley. As controls over land use change over time, it is possible that lands that are presently undeveloped will be used for commercial development. Cumulative impacts to land use patterns and zoning are likely to be far-reaching and significant.

Land use and zoning changes attributable to the Ivanpah Energy Center are expected to represent a negligible incremental impact, when compared to previous and reasonably foreseeable changes.

Cumulative Impacts to Range Management

The Jean Lake Grazing Allotment (Allotment #15416) has been previously impacted by construction and maintenance of numerous transmission lines through the area and ongoing construction of the Reliant Bighorn to Arden Substation Transmission Line. Potential cumulative impacts associated with the proposed action, in combination with the proposed Sempra Energy Natural Gas Supply Pipeline Project are expected to represent largely temporary negligible cumulative impacts to the resource.

Implementation of the Clark County Conservation of Public Lands and Natural Resources Act of 2002 could result in far reaching impacts to BLM grazing lands east of I-15. A large portion of designated grazing lands lies within the designated noise compatibility areas which could become developed for business or industrial use in future years. If development were to occur, livestock production within the area could become less than viable.

Cumulative Impacts to Recreation

Recreation activities in the Ivanpah Valley are likely to be significantly impacted by development of the Ivanpah Valley Airport. Additional cumulative impacts to recreation could occur as a result of implementation of the Clark County Conservation of Public Lands and Natural Resources Act of 2002. Although ramifications of the legislation cannot be fully

determined, development within the noise compatibility area could significantly impact recreational activities within the area. Although construction and operation of the Ivanpah Energy Center (regardless of plant site location) is likely to have little impact on recreation in the area, cumulative effects of other actions are likely to be significant.

Cumulative Impacts to Transportation

Simultaneous development of the Table Mountain Wind Energy Project and the Ivanpah Energy Center could cumulatively result in moderate impacts to traffic along SR 161. The use of the southern access road to the plant site and scheduling of construction activities at both locations could reduce the extent of cumulative impacts to traffic.

Impacts to traffic resulting from construction of several proposed projects in the area, particularly if construction schedules coincide, and the additional truck traffic from the haul road across SR 161 from the plant access road.

Additional development within Ivanpah Valley that would be related to development and operation of Ivanpah Airport, the Las Vegas – Southern California Maglev System, and induced development related to increased water availability due to the proposed Las Vegas Water District Pipeline would create the need for additional roads and highways. As development within the valley increases, existing highways, such as SR 161 and Sandy Valley Road would become more congested and improvements would be needed. Although development and operation of the Ivanpah Energy (regardless of plant site location) would contribute to transportation impacts, those related to increased development within the area would be significantly greater.

Cumulative Impacts Related to Hazardous Materials

Project-related impacts associated with hazardous materials are not anticipated. However, development of the Ivanpah Airport and potential induced development related to increased water availability related to the Las Vegas Valley Water District Pipeline and land use changes related to passage of the Clark County Conservation of Public Lands and Natural Resources Act of 2002 could increase the potential for a release of hazardous materials within the area. Due to regulations governing the transportation, storage, and disposal of hazardous materials, cumulative impacts related to hazardous materials are not expected to be significant.

Cumulative Impacts to Public Services

Project-related impacts to public services are not anticipated. However, the need for additional public services is likely to increase as development within the Ivanpah Valley continues to increase. Future actions that are likely to affect the need for public services include induced development as a result of increased water availability (Las Vegas Valley Water District Pipeline) and land use changes related to the Clark County Conservation of Public Lands and Natural Resources Act of 2002.

Cumulative Impacts to Visual Resources

Development of the Ivanpah Energy Center (regardless of plant site location) would not result in significant visual

impacts within the area. However, increased development within the Ivanpah Valley would be expected as a result of induced development related to increased water availability due to the proposed Las Vegas Valley Water District Pipeline. Other future actions would result in and land use changes that would be attributable to implementation of the Clark County Conservation of Public Lands and Natural Resources Act of 2002 and development of the proposed Ivanpah Airport. In combination, the cumulative effects of such future actions could result in significant visual impacts within the area.

Construction and operation of project-related transmission lines in Ivanpah Valley and Eldorado Valley would result in minimal visual impacts at the I-15 and US 95 crossings. However, as development increases along the I-15 corridor and traffic increases along US 95 in Eldorado Valley, the potential for significant visual impacts increases.

Cumulative Impacts to Air Quality

Ivanpah Energy Center would be designed to be at, or below, national and local air quality standards. Consequently, emissions would result in a negligible impact to air quality in the Ivanpah Valley.

Concerns regarding cumulative impacts to air quality resulting from other proposed projects.

Air quality modeling was carried out to determine the cumulative effects of Proposed Ivanpah Energy Center operations at the Goodsprings Plant Site, aircraft operations at the proposed Ivanpah Valley Airport, and operations of the Reliant Energy Bighorn Facility. Modeling results were provided to the Clark County Department of Air Quality Management (DAQM) and are discussed in Section 5.1.12.

Emissions from the proposed airport were modeled as two sources at two points within the airport property. The sources were described as two vertical columns, each about 600 meters tall and about 1.7 miles apart to simulate the vertical range of aircraft while landing and taking off. The columns were only about 5 meters wide and did not fully simulate the horizontal extent of the emissions; as a result, emissions from the airport were over predicted. The analysis also assumed that all NOx emissions would convert entirely to NO_2, although it is unlikely that full conversion would occur before the point of maximum impact.

Additional modeling runs were made for NO_2 and PM_{10} that included existing and proposed sources in the Ivanpah Valley, as provided in the air quality permit application to the DAQM. Results of the modeling indicate the maximum NO_2 (annual) impact from the sources is 31.6 $\mu g/m^3$, which exceeds the allowable increment of 25 $\mu g/m^3$. This impact, was determined to be almost entirely (more than 99 percent) from estimated airport emissions. As stated previously, the heavy concentration of all airport emissions at two points, and the assumed full conversion of NOx to NO_2 would tend to greatly over predict actual impacts from airport sources of NOx. The maximum contribution from the project (based on the Goodsprings Plant Site location), within locations where levels were 20 $\mu g/m^3$ or greater was 0.1 $\mu g/m^3$. Therefore, project contributions to the cumulative air emissions were considered to represent a negligible impact.

Analyses of maximum impacts for average 24-hour and average annual PM_{10} emissions were determined to be 16.7 and 4.2 $\mu g/m^3$, respectively, which are well below allowable increments. For the analysis, it was assumed that the Ivanpah Energy Center (Goodsprings Plant Site location) contributed the entire amount of the impact. As stated in Section 5.1.12 and shown in Table 5-21, calculated annual NO_2 impacts are just 32 percent of the air quality standards, and 85 percent of that impact is due to estimated airport emissions. Calculated maximum total PM_{10} 24-hour and annual impacts are 12 and 9 percent of applicable air quality standards, respectively.

Although additional modeling would be required to fully address potential air quality impacts that would be associated with plant operations at the Primm Plant Site, it is likely that they would be similar to those of the Goodsprings Plant Site. Other factors that are likely to affect air quality in the Ivanpah Valley include land use changes that would be attributable to induced development related to increased water availability (Las Vegas Valley Water District pipeline), land use changes associated with implementation of the Clark County Conservation of Public Lands and Natural Resources Act of 2002, and expansion of the KRGT Compressor Station at Goodsprings.

Cumulative Impacts to Noise

Potential cumulative impacts to noise levels that would be associated with the Ivanpah Energy Center at Goodsprings and continued operation of the KRGT Compressor Station at Goodsprings or development of the Ivanpah Energy Center at Primm and simultaneous operation of the Reliant Bighorn Facility are not expected to result in cumulative impacts to sensitive receptors. However, future actions such as operation of the Ivanpah Airport and land use changes related to water availability and those that could result from implementation of Clark County Conser-vation of Public Lands and Natural Resources Act of 2002 are likely to result in overall increases in noise levels in Ivanpah Valley; in some areas, related cumulative impacts could be significant.

Cumulative Impacts to Socioeconomics

Development and operation of the proposed Ivanpah Energy Center is expected to have negligible beneficial impacts to the economy and tax base of Clark County and the Goodsprings community. Cumulative beneficial and adverse socioeconomic impacts would be expected as a result of future actions that would change the character of Ivanpah Valley. Induced development related to increased water availability, the presence of Ivanpah Airport, and land use changes related to the implementation of Clark County Conservation of Public Lands and Natural Resources Act of 2002 are likely to change the character of the Goodsprings and Sandy Valley communities. Increased development is likely to result in cumulative beneficial affects to public services and the local tax base as a result of development; however, many residents are likely to experience adverse impacts as their lifestyle changes from rural to urban.

Cumulative Impacts to Environmental Justice

Development and operation of the Ivanpah Energy Center (regardless of plant site location) is not expected to affect minority or low-income populations. Due to the

absence of such populations within the Ivanpah Valley, adverse impacts related to other reasonably foreseeable projects are not anticipated.

6.3 SHORT-TERM USES OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY

Short-term uses is defined as the period of construction, though restoration actions. Long-term productivity is defined as the life of the project (at least 30 years), through decommissioning and restoration. Construction of the Ivanpah Energy Center (regardless of plant site location) and related facilities is expected to result in greater impacts than those of project operations and decommissioning. Construction at either the Goodsprings location or the Primm location commit the temporary use of 294 to 317 acres of federal land during construction. Long-term (permanent for the life of the project) commitments of federal land would range from nine acres (Primm Plant Site Alternative) to 42 acres (Proposed Goodsprings Plant Site Alternative). Lands that would be temporarily used during construction would represent a short-term use of the environment because they would be restored and returned to the BLM following restoration.

Short-term uses of the environment also would result in a variety of impacts to the physical, biological, and human environment as discussed in Section 5 (Impacts). However, such impacts would be offset during the life of the project through the generation of reliable power that would be available to the competitive market. The long-term availability of power would have far reaching benefits to society throughout southern Nevada and southern California.

6.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction and operation of the Ivanpah Energy Center (regardless of plant site location) and related facilities would require the commitment of a variety of resources that cannot be replaced, restored, or recovered. Project construction also would use a variety of resources that, after decommissioning of the facility, could be restored and returned for use in the future. Resources that would be irreversibly used and irretrievably committed as part of the project are summarized in Table 6-5.

Table 6-5 Irreversible and Irretrievable Commitment of Resources

Resource Affected	Period of Commitment	Irreversible	Irretrievable
Geology, Soils, and Minerals Resources	Long-term accelerated soil erosion on steep slopes	Yes	Yes
Groundwater/Surface Water Resources	Negligible groundwater needs	Yes	Yes
Biological Resources	Long-term loss of habitat	No	No
Cultural Resources	Loss during construction	Yes	Yes
Paleontological Resources	Loss during construction	Yes	Yes
Land Use and Zoning	Long-term	No	No
Range Management	Temporary use of area	No	No
Recreation	Temporary use of area	No	No
Transportation	Temporary use of area	No	No
Public Services and Utilities	Long-term	---	No
Hazardous Materials	Primarily during construction	No	No
Visual Resources	Long-term (life of project)	No	No
Air Quality	Long-term (life of project)	No	No
Noise	Long-term (life of project)	--	No
Socioeconomics	Primarily during construction	No	No
Environmental Justice	Not determined to be an issue	---	---

6.5 ENVIRONMENTALLY SENSITIVE AREAS NOT AFFECTED

The Mojave National Scenic Preserve and the Stateline and Mesquite Wilderness areas are well removed from the proposed IEC plant site, access roads, the water supply pipeline route, or transmission line rights-of-way that are incorporated into the proposed action. Similarly, the Red Rock Canyon Conservation Area, the Spring Mountains National Recreation Area, and the North and South McCullough Mountains Wilderness Study Areas would not be affected by construction or operation of the proposed project or its components.

Information received from the Nevada Department of Conservation and Natural Resources Commission for the Preservation of Wild Horses (Barcomb, 2002) indicates that the project site is "... located several miles south of the Red Rock Herd Management Area ..." and that the proposed action would not affect wild horse and burro herds.

SECTION 7
REFERENCES

Barger, Mary
1997 *A Cultural Resources Inventory of the Proposed Modifications to the Mead Substation, Clark County, Nevada.* BLM Report Number Misc #128. Prepared for Western Area Power Administration, Desert Southwest Region, Phoenix, Arizona. Report on File Western Area Power Administration, Golden Colorado.

Barcomb, C., 2002. Letter dated March 18, 2002 from the Nevada Department of Conservation and Natural Resources Commission for the Preservation of Wild Horses.

Barker, James P., Carol H. Rector, and Philip J. Wilke
1979 *An Archaeological Sampling of the Proposed Allen-Warner Valley Energy System, Western Transmission Line Corridors, Mojave Desert, Los Angeles and San Bernardino Counties, California, and Clark County Nevada.* BLM Report Number 5-904(P). For Southern California Edison Company, Rosemead, California. Archaeological Research Unit, University of California, Riverside.

Bentley, Clint. 2002. Personal communication with G. High and P. Roberts, Parsons, May 2002.

Bettinger, Robert L. and Martin A. Baumhoff, 1982. The Numic Spread: Great Basin Cultures in Competition. *American Antiquity* 46(3):485-503.

Boulder City Chamber of Commerce, 2002. http://www.bouldercitychamber.com.

Brooks, R. H., D.O. Larson, J. King, et al., 1977 *The Archaeology of the Mariah Site, 26-Ln-618, White River Narrow, Lincoln County, Nevada.* Cultural Resources Report 4-48. Bureau of Land Management, Las Vegas, Nevada.

Blair, Lynda M. and Susan R. Edwards
1990 *A Cultural Resource Inventory of the Proposed McCullough-Arden 230kV Transmission Line for the Nevada Power Company, Clark County, Nevada.* DAS Report Number 5-4-14. BLM Report Number 5-1994(P). Division of Anthropological Studies, Environmental Research Center, Marjorie Barrick Museum of Natural History, University of Nevada-Las Vegas.

Blair, Lynda M., Jeffrey R. Wedding, Diane L. Winslow, William G. White, Gregory R. Seymour, and Dave Smee1999 *Apex Industrial Park, Inc. Cultural Resource Investigations of 8489 Acres (Below 30% Slope) Northern Las Vegas Valley Part I-Results and Recommendations.* Submitted to Nevada Environmental Consultants, Inc. and the Bureau of Land Management, Las Vegas District. BLM Report No. 5-2377(P). Harry Reid Center for Environmental Studies, Marjorie Barrick Museum of Natural History, University of Nevada- Las Vegas.

Blair, Lynda M., Jeffrey R. Wedding, William G. White, Diane L. Winslow, Susan Murphy, David Smee, Wendy Andrejack, Amy Brock, and Jacob Ambros

2001 *Cultural Resource Class I and Class III Investigations fo the Proposed 2003 Kern River Expansion Project.* Prepared for Williams Gas Pipeline Company. HRC Report 5-150-14(1). BLM Report Number 5-2411. Harry Reid Center for Environmental studies, Marjorie Barrick Museum of Natural History, University of Nevada-Las Vegas.

Bondley, George A. and Richard H. Brooks

1973 *An Archaeological Survey of the Mead-Davis-Parker 230kV Transmission Line #2.* BLM Report Number 5-1123(P). Southern Branch, Nevada Archaeological Survey, University of Nevada, Las Vegas.

Brooks, Richard H., Michaeol Compton, and Kathryne Olson

1977 *Final Report on the Preliminary Archaeological Reconnaissance of the Proposed Eldorado/Kaiparowits Transmission Line Right-of-Way Corridor and Alternate Route.* Report Number 5-2-2. Prepared for the Southern California Edison Company. Report on file at Nevada Archaeological Survey, University of Nevada, Las Vegas.

Brooks, Richard H., Daniel O. Larson, and Joseph King

1977 *The Archaeology of the Mariah Site, 26-Ln-618, White River Narrow, Lincoln County, Nevada.* Cultural Resources Report 4-48. Bureau of Land Management, Las Vegas, Nevada.

Brooks, Richard H., Daniel O. Larson, Kathryne Olson, Joseph King, Gregory King, Robert Leavitt, and Patricia Anderson

1975 *Prehistoric and Historic Research Along the Navajo-McCullough Transmission Line Right-of-Way for Los Angeles Water and Power in Clark and Lincoln Counties, Nevada.* BLM Report Number 5-166(P) and 4-2-1. Report on file at Nevada Archaeological Survey, University of Nevada-Las Vegas.

Bunte, Pamela, and Robert J. Franklin, 1987 *From the Sands to the Mountain: Change and Persistence in a Southern Paiute Community*. University of Nebraska Press, Lincoln.

Burbey, T.J., 1997. Hydrology and potential for groundwater development, carbonate-rock aquifers, southern Nevada and southeastern California: U.S. Geological Survey, Water Resources Investigations Report 95-4168.

Burchfiel, B.C. and Davis, G.A., 1981. *Mojave Desert and environs:* in Ernst, W.G., ed., The Geotectonic Development of California, Rubey Volume I, Prentice-Hall, NJ, p. 218-252.

Bureau of Land Management (BLM), 1998. *Las Vegas Resource Management Plan,* Volumes 1 and 2, Las Vegas Field Office.

_____, 1986a. Visual Resource Management (VRM) Guidelines.

_____, 1986b. BLM Manual Handbook 8431-1 Visual Resource Contrast Rating.

_____, 1997. BLM Las Vegas Field Office Programmatic Section 7 for Desert Tortoises Map, November 1997.

_____, 2001. Nevada Wilderness Study Area Notebook, March 2001.

Burroughs, Michael, 2002. Personal communication with G. High, Parsons, October, 2002.

California Energy Commission, 2002. http://www.energy.ca.gov/.

Callister, Kathleen, David Powers and William Zukosky
1993 *Class III Cultural Resource Inventory for Los Angeles Department of Water and Power - Mead to Adelanto Transmission Line Project: Eldorado and Roach Lake Divisions.* Cultural Resources Report Number 5-2204. Dames and Moore, Inc., Las Vegas, Nevada.

Cardenas, N., 2002. Personal communication with P. Roberts, Parsons, May 2002.

_____, 2002. Personal communication with P. Roberts, Parsons, August, 2002.

Chaffee, M.A. and Kristin H. Berry, 1999. Twenty-Fourth Annual Meeting and Symposium of the Desert Tortoise Council, March 5-8, 1999 Abstracts, *The Search for Soutces of Potential Toxicants in Desert Tortoises: Results of a Pilot Project Incorporating Surficial Materials and Plants from Three Areas in Southeastern California*, 1999.

Chaffee, M.A. and Kristin H. Berry, 2000. 26th Annual Meeting and Symposium of the Desert Tortoise Council, April 21-24, 2000 Abstracts, *Tortoise Health and Elemental Chemistry of Forage Plants from Desert Tortoise Habitat between the Rand Mining District and the Desert Tortoise Natural Area, California,* 2002.

Civilian Conservation Corp (CCC), 1934-42. Nevada Camp Inspection reports, 1934-1942. Photocopies from microfilm in the United States National Archives. On file in Special Collections, James R. Dickinson Library, University of Nevada-Las Vegas.

City of Boulder City, 2002. *City of Boulder City Special Events Master List as of February 20, 2002.*

_____, 2002. http://www.ci.boulder-city.nv.us/.

Clark County Department of Air Quality Management, 2002. http://www.air.cchd.org.

Clark County Tax Assessor, 2002. http://www.co.clark.nv.us/assessor/Taxrated.htm

Clark County Comprehensive Planning, 2002. Clark County Demographics Summary, http://www.co.clark.nv.us/Comprehensive_planning/.

Clark County School District, 2002. http://www.ccsd.net/news/geninfo.

Callister, Kathleen, David Powers and William Zukosky
1993 *Class III Cultural Resource Inventory for Los Angeles Department of Water and Power - Mead to Adelanto Transmission Line Project: Eldorado and Roach Lake Divisions.* Cultural Resources Report Number 5-2204. Dames and Moore, Inc., Las Vegas, Nevada.

Cline, G. G., 1963, *Exploring the Great Basin*. University of Oklahoma Press, Norman.

Crabtree, Evan R., James Heid, and Richard H. Brooks
1980 *A Cultural Resource Investigation of Seismic Line #12 Clark County, Nevada and San Bernardino County, California.* Archaeological Research Center Report Number 5-25-8. Prepared for Seisdata Services Incorporated. Archaeological Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Crabtree, Evan R., James Heid, and Richard H. Brooks
1980 *A Cultural Resource Investigation of Seismic Line #12 Clark County, Nevada and San Bernardino County, California.* Archaeological Research Center Report Number 5-25-8. Prepared for Seisdata Services Incorporated. Archaeological Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Dames and Moore, 1997. Results of the Archaeological Investigation on Three Lakes Valley, *South Dry Lake Basin, Near Point Bravo, Nellis Air Force Range, Nevada*. Prepared for U.S. Army Corps of Engineers, Project No. 001704/OS-005071. Dames and Moore, Las Vegas, NV.

Davis, Gene P.
1990 *Temporary Use Application Environmental Supplement: Biology and Archaeology Survey Results for the Proposed Goodsprings Compressor Station Site.* BLM Report Number 5-1963 7 5-1979(P). On file at Division of Anthropological Studies, Environmental Research Center, Univesity of Nevada – Las Vegas.

Davis, Gene P., J. Simon Bruder, Everett J. Bassett, and A.E. Rogge
1989 *Cultural Resources Technical Report for the AT&T Communications Fiber Optic Project Between Flagstaff, Arizona and Las Vegas, Nevada, The Nevada Segment.* BLM Report Number 5-1955 (P). Prepared for AT&T Communications, Inc. Pleasanton, California. Report on file at Dames and Moore, Phoenix, Arizona.

Davis, Gene P. and Anne DuBarton
1991 *Clark County Regional Flood Control District Final Master Plan: 10-Year Plan Facility Cultural Resource Survey Report.* BLM Report Number 5-2127(P). Prepared for USDI Bureau of Land Management Clark County Regional Flood Control District, Las Vegas, Nevada and Department of the Army Sacramento District Corps of Engineers. Dames and Moore, Las Vegas, Nevada.

Dettinger, M.D., Harrill, J.R., Schmidt, D.L. and John W. Hess, Distribution of Carbonate-Rock Aquifers and the Potential for Their Development, Southern Nevada and Adjacent Parts of California, Arizona, and Utah: U.S. Geological Survey and Desert Research Institute, Water-Resources Investigations Report 91-04146.

Diele, Robert and Keith Myhrer
1987 *Class III Cultural Resource Inventory Report.* Report Number 5-1705(N). USDI Bureau of Land Managment, Las Vegas District.

DuBarton, Anne and Susan Edwards
1991 Kern River Pipeline Cultural Resources Inventory Report: Goodspring Compressor Station Relocation Survey and Line Reroute. Supplemental Nevada Report Number 6: Survey of the Southwest Gas Metering Station. BLM Report Number 5-1985 and 5-1985#6. Submitted to Federal Energy Regulatory Commission. Dames and Moore, Las Vegas, Nevada.

Dohrenwend, J.C., Menges, C.M., Schell, B.A., and Moring, B.C., 1991. Reconnaissance photogeologic map of young faults in the Las Vegas 1° x 2° Quadrangle, Nevada, California, and Arizona: U.S. Geological Survey Miscellaneous Field Studies Map MF-2182.

Domico, L., Homer, B., Berry, K., Cousins, R., Jacobson, E., Klein, P.,and Williams, E., 2001. 26th Annual Meeting and Symposium of the Desert Tortoise Council, March 16-18, 2001 Abstracts, *Purification of Desert Tortoise (Gopherus agassizii) Metallothionein, A Potential Biomarker of Heavy Metal Exposure*, 2001.

Duebendorfer, E.M. and Wallin, E.T., 1991. Basin development and syntectonic sedimentation associated with kinematically coupled strike-slip and detachment faulting, southern Nevada: *Geology*, Vol. 19, p. 87-90.

Drucker, Phillip, 1937, Culture Element Distributions, V: Southern California. *University of California Anthropological Records* 1(1):1-52. 1941. Culture Element Distributions, XVII: Yuman-Piman. *University of California Anthropological Records* 6(3):91-230.

Eaton, G.P., 1982. The Basin and Range province: origin and tectonic significance: *Annual Review of Earth and Planetary Sciences,* Vol. 10, p. 409-440.

Elliot, Russel R., 1987 *History of Nevada.* Second Edition. University of Nebraska Press, Lincoln.

Elston, Robert G., 1982, Good Times, Hard Times: Prehistoric Culture Change in the Western Great Basin. In *Man and Environment in the Great Basin,* edited by David B. Madsen and James F. O'Connell, pp. 186-206. Society for American Archaeology Papers 2. Washington.

1986 Prehistory of the Western Area. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 135-148. Handbook of North American Indians, Vol. 11, W.C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Energy Information Administration, 2002. Annual Energy Outlook 2002 with Projections to 2020, www.eia.doe.gov/fuelelectric.html.

_____, 2002. Subsequent Events – California's Energy Crisis, http://www.eia.doe.gov/cneaf/electricity/california/subsequentevents.html.

_____, 1998. State Electric Profiles, California, Arizona, Nevada.

Euler Robert C., 1964, Southern Paiute Archaeology. *American Antiquity* 29(3):379-381.

1966 *Southern Paiute Ethnohistory*. Glen Canyon Series 28, University of Utah Anthropological Papers 78. Salt Lake City.

1972 *The Paiute People*. Indian Tribal Series, Phoenix, Arizona.

Ezzo, Joseph A., Teresita Majewski, Jeffrey H. Altschul, Keith Knoblock, and Mark T. Swanson, 1995, A Class III Cultural Resources Survey for the Southern Nevada Water Authority Treatment and Transmission Facility, Clark County, Nevada. Statistical Research Technical Series No. 55, Tucson.

Federal Register, Vol, 43, No. 164, August 23, 1978.

Federal Register, Vol. 44, No. 237, December 7, 1979.

Federal Register, Vol. 50, No. 63, April 2, 1985

Federal Register, Vol. 54, No. 149, August 4, 1989.

Fehner, T., and F.G. Gosling, 2000, Origins of the Nevada Test Site. DOE/NV.

Foley, James
1974 BLM Antiquities Site Inventory. BLM Report 5-47(N). Submitted to USDI Bureau of Land Management, Las Vegas District.

Force, C., 1991. Late Pleistocen – Early Holocens Woodrat (Neotoma sp.) Dental Remains from Kokoweef Cave, San Bernardino County, California. IN: *Crossing the Borders: Quarternary Studies in Eastern California and Southwestern Nevada*, San Bernardino County Museum Special Publication MDQRC 1991, pg. 104-106.

Fowler, Don D. and David B. Madsen, 1986, Prehistory of the Southeastern Area. In *Handbook of North American Indians, Volume 11: Great Basin,* edited by Warren L. D'Azevedo, pp. 173-182. Smithsonian Institution Press, Washington.

Fowler, Don D., Robert C. Euler, and Catherine Fowler, 1969, *John Wesley Powell and the Anthropology of the Canyon Country*. U.S. Geological Survey Professional paper No. 670. U.S. Department of the Interior, USGS, Washington, D.C.

Fowler, Don D., Elizabeth Budy, Dennis DeSart, Joyce Bath, and Alma Smith
1978 *Class II Cultural Resources Field Sampling Inventory Along Proposed IPP Transmission Line Corridors, Utah-Nevada-California.* Report Number 5-400(P). Desert Research Institute, Publication No. 7200. Social Sciences Center, Technical Report No. 4.

Glancy, P.A., 1968. Water resources appraisal of Mesquite-Ivanpah Valley area, Nevada and California: Nevada Department of Conservation and Natural Resources, Water Resources Reconnaissance Series Report 46.

Green, Eileen M. and Richard H. Brooks
1980 *A Cultural Resource Investigation of the Southern Section of Seismic Line #10 in Ivanpah and Jean lake Valleys Clark County, Nevada.* Archaeological Research Center Report Number 5-25-10. BLM Report Number 5-2248(P). Prepared for Seisdata Services Company. Archaeological Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Guth, P.L. *et al.*, 1988. *Tertiary extensional basins of northwestern Clark County, Nevada,* in Weide, D.L. and Faber, M.L., eds., This Extended Land, Geological Journeys in the Southern Basin and Range: Geological Society of America Cordilleran Section Guidebook, p. 239-253.

Harmsen, S.C., 1991. Seismicity and focal mechanisms for the southern Great Basin of Nevada and California in 1990: U.S. Geological Survey, Open-File Report 91-367.

Harper, Christopher, Suzan Rose, and Christopher Young
2001 *Archaeological Investigations of the Bighorn Power Generation Facility, Primm to Arden Transmission Line and Ancillary Facilities Associated with the Bighorn Generation Project, Clark County, Nevada.* BLM Report Number 5-2408. Prepared for Reliant Energy, Inc. Houston, Texas. Submitted to USDI Bureau of Land Management Las Vegas District. URS Corporation, Las Vegas, Nevada.

Harrington, Mark R.
1930 Archaeological Explorations in Southern Nevada; Report of the First Session Expedition 1929, Introduction. *Southwest Museum Papers* 4:1-25. Los Angeles.

Harrington, Mark R. and Ruth D. Simpson, 1961, Tule Springs, Nevada, with Other Evidence of Pleistocene Man in North America. *Southwest Museum Papers 18.* Los Angeles.

Harrill, J.R., Gates, J.S., and Thomas, J.M., 1988. Major groundwater flow systems in the Great Basin region of Nevada, Utah, and adjacent states: U.S. Geological Survey, Hydrologic Investigations Atlas HA-694-C.

Hart, E.W. and Bryant, W.A., 1999. Fault-rupture hazard zones in California, revised 1997, Supplements 1 and 2 added 1999: California Division of Mines and Geology, Special Publication 42.

Hauck, F. R., D.G. Weder, L. Drollinger, and A. McDonald, 1979, A Cultural Resource Evaluation in Clark County, Nevada. Pt. 1: Cultural Resource Overview. *Archaeological-Environmental Research Corporation Paper 17.* Salt Lake City.

Heid, James and Richard H. Brooks.
1980 *A Cultural Resource Investigation of Seismic Line #9, Ivanpah Valley, Nevada and California.* Archaeological Research Center Report Number 5-25-7. BLM Report Number 5-643(P). Prepared for Seisdata Services, Incorporated. Archaeological Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Hewitt, D.F., 1931. Geology and ore deposits of the Goodsprings quadrangle, Nevada. United States Geological Survey Professional Paper 162.

Hewett, D.F., 1956. Geology and mineral resources of the Ivanpah Quadrangle, California and Nevada: U.S. Geological Survey, Professional Paper 275.

Hulse, James W., 1990, *The Nevada Adventure*. Sixth edition. University of Reno Press, Reno.
1991 *The Silver State*. University of Nevada Press, Reno .

International Conference of Building Officials (ICBO), 1994. Uniform Building Code, Whittier, CA

Inter-Tribal Council Of Nevada (ITCN), 1976, *Nuwuvi: A Southern Paiute History*. Inter-Tribal Council of Nevada, Reno.

Ivanpah Energy Center, 2001. Proponent's Environmental Analysis (PEA), December 2001.

_____, 2002. *Ivanpah Energy Center* PowerPoint Presentation, March 2002.

Janetski, Joel C., 1994 Recent Transitions in the Eastern Great Basin: The Archaeological Record. In *Across the West: Human Population Movement and the Expansion of the Numa*, edited by David B. Madsen and David Rhode, pp 157-178. University of Utah Press, Salt Lake City.

Jennings, Jesse D., 1957, Danger Cave. *University of Utah Anthropological Papers 27.* Salt Lake City.

1964 The Desert West. In *Prehistoric Man in the New World,* edited by Jesse D. Jennings and Edward Norbeck. University of Chicago Press. Chicago.

1966 Early Man in the Desert West. (Proceedings of the 7th Congress of the International Association for Quaternary Research, Vol 15). *Quaternaria* 8:81-89. Rome.

1986 Prehistory. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 161-283. Handbook of North American Indians, Vol. 11, W.C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Johnson, Jeff, Senior Hydrolist, Las Vegas Valley Water District, 2002. Personal communications with P. Roberts with Parsons, October 2002.

Johnston, Jeff

1994 *A Class II Inventory of the Proposed Eldorado Valley Land Acts, Clark County, Nevada.* Prepared for Bureau of Land Management, Las Vegas District Office, Las Vegas Nevada. BLM Report Number 5-2259(P). Report on file at Mariah Associates, Inc. Reno, Nevada

Jones, Florence L. and John F. Cahlan, 1975, *Water, A History of Las Vegas, Volume I.* Las Vegas Valley Water District, Las Vegas, Nevada.

Kelly, Christina and John W. Jones

2002 *Results of Class I Cultural Resource Inventory: Ivanpah Power Generation Project Clark County, Nevada.* Prepared for USDI Bureau of Land Management Las Vegas District. SWCA Report Number 02-556. Report on file at SWCA, Inc. Reno, Nevada.

Kelly, Isabel T., 1934, Southern Paiute Bands. *American Anthropologist* 36(4):548-560.

1939 Southern Paiute Shamanism. *University of California Anthropological Records* 2(4):151-157.

1964 *Southern Paiute Ethnography*. University of Utah Anthropological Papers 69. Salt Lake City.

1976 Southern Paiute Ethnography. In *Paiute Indians II*, compiled and edited by David Agee Horr, pp. 11-223. Garland Publishing Inc., New York.

Kelly, Isabel T., and Catherine S. Fowler, 1986 Southern Paiute. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 368-397. Handbook of North American Indians, Vol. 11, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Kelly, Michael S., James H. Cleland, Kathleen L. Hull, Alison J. Macdougall, Paul Friedman, 1990 *Kern River Gas Transmission Company Kern River Pipeline Cultural Resource Survey Report Nevada*, Bureau of Land Management Report 5-1985, Las Vegas.

Kern River 2003 Expansion Project Draft Environmental Impact Statement / Environmental Impact Report, February 2002.

Killam, William R.
1987 *Cultural Resources Investigations of Mead 69-kV Transmission Lines Clark County, Nevada.* BLM Report Number 5-1739(P). Prepared for Western Area Power Administration, Boulder City, Nevada. Report on file at J.F. Sato and Associates, Golden, Colorado.

Knight, Kenneth C. and Robert M. Leavitt
1982 *District I Betterment, W.O. 20726 NDOT-063-82B.* BLM Report Number 5-1108(P). Submitted to the USDI Bureau of Land Management, Las Vegas District Office.

Knight, Kenneth C., Robert M. Leavitt, and Valerie Rodman
1985 *Improvements and Maintenance on I-15, W.O. 20726 NDOT-012-85R.* BLM Report Number 5-1476(P). Submitted to the USDI Bureau of Land Management, Las Vegas District Office.

Kyle, Carolyn
1999 *Constraint-Level Report for WDO8-E Line Cultural Resources Survey.* HDR Memorandum. Miscellaneous #136.

Lane, S., 2002. Human Resources, Primadonna Company, LLC. Personal communication with P. Roberts, Parsons, August 2002.

Las Vegas Leisure Guide, 2002, Internet website access at <http://www.pcap.com/lasvegas.htm> on June 20,2002.

Las Vegas Valley Water District (LVVWD), 2001. Annual Report on Well Pumpage, Water Level, and Recharge at Jean, Ivanpah Valley, Clark County, Nevada.

Larson, P.P. 1977. *The Sierra Club Naturalist's Guide to the Deserts of the Southwest.* San Francisco, California: Sierra Club Books. p. 286.

Lawrence, Pamela
2000 *A Preliminary Report on Previous Cultural Resource Investigations and Sites Likely to be Encountered Within the Proposed Alignments for the Boulder City U.S. 93 Corridor.* HRC Report 5-165-7. Submitted to CH2MHILL. Harry Reid Center for Environmental Studies, Marjorie Barrick Museum of Natural History, University of Nevada - Las Vegas.

Leavitt, R.

1980 *Contract 1871 NDOT-136-80P.* BLM Report Number 5-861(P). Nevada Department of Transportation.

1982 *Material Location for IR-15, Stateline Exchange, EA 71084.* BLM Report Number 5-1068(N). Nevada Department of Transportation.

Longwell, C.R., Pampeyan, E.H., Bowyer, B. and Roberts, R.J., 1965. Geology and mineral deposits of Clark County Nevada: Nevada Bureau of Mines and Geology, Bulletin 62.

Lyneis, Margaret M., Jeanne Clark, Richard McCarty, and Tara Shepperson
1978 *Archaeological Element Historic Preservation Assessment and Planning Process City of Las Vegas.* Department of Anthropology, University of Nevada-Las Vegas. Cultural Resource Report 4-1-4.

Madsen, David B.
1975 Dating Paiute-Shoshone Expansion in the Great Basin. *American Antiquity* 40(1):82-85.

Madsen, David B. and D. Rhode (eds.), 1995, *Across the West: Human Population Movement and the Expansion of the Numa.* University of Utah Press, Salt Lake City.

Martin, Beverly L.
1978 *TUP Application for Construction Site, City of Los Angeles.* CR Report Number 5-458(N). Submitted to USDI Bureau of Land Management, Las Vegas, Stateline Planning Unit.

Martineau, Lavan, 1992 *The Southern Paiutes: Legends, Lore, Language, and Lineage.* KC Publications, Las Vegas, Nevada.

Matranga, Peter F., Jr.
1991 *Archaeological Testing of 26Ck4043 Clark County, Nevada.* BLM Report Number 5-2138(P). Prepared for Cultural Resources Section Environmental Services Division Nevada Department of Transportation, Carson City, Nevada.

Miller, F.K., Matti, J.C., Brown, H.J., and Powell, R.E., 1998, Geologic map of the Fawnskin 7.5' quadrangle, San Bernardino County, California: U.S. Geological Survey Open-File Report 98-579, U.S. Geological Survey, Menlo Park, California.

Moore, J. and R. Leavitt
1979 *EA 70971 NDOT-010-80P.* Submitted to USDI Bureau of Land Management, Las Vegas District.

Moore, Joe, Gary Scott, Patty DeBunch, and Jean Schaaf
1982 *EA 71100 NDOT-078-82R.* BLM Report Number 5-1042(N). Submitted to USDI Bureau of Land Management, Las Vegas District.

Museum of Northern Arizona
1995 *Mead to Phoenix 500kV DC Transmission Line Project Environmental Report Chapter 8 Archaeological and Historical Cultural Resources.* BLM Report Number 5-1325(N). Museum of Northern Arizona, Department of Archaeology.

Myhrer, Keith
1994 *Inventory for Jean Airport Land/Lease, Clark County, Nevada.* BLM Report Number 5-2284(n). Submitted to USDI Bureau of Land Management, Las Vegas District, Stateline Resource Area.

1995 *Inventory for a Mineral Material Sale Southeast of Jean Dry Lake, Clark County, Nevada (N-59651).* BLM Report Number 5-2301(N). Submitted to USDI Bureau of Land Management, Las Vegas District, Stateline Resource Area.

Necas, M., 2002. Chief Engineer, Primadonna Company, LLC. Personal communication with P. Roberts, Parsons, August 2002.

Nevada Bat Working Group, 2002. Nevada Bat Conservation Plan, June 21, 2002.

Nevada Department of Employment, Training, and Rehabilitation, 2002. Las Vegas MSA Labor Force & Employment/Year-Over-Year Change: 2002 Year-To-Date Summary, http://www.detr.state.nv.us/lmi/data/monthly/2002lvsum.htm.

_____, 2002. Clark County, Nevada (Las Vegas Area) – Top 50 Employers September 2001, 3rd Quarter, http://www.detr.state.nv.us/lmi/data/empprofiles/top_003.htm.

Nevada Department of Taxation, 2002. http://www.tax.state.nv.us/taxnew/overview.htm

Nevada Department of Transportation, 1937. *NDOT Plan and Profile of Proposed State Highway, Clark County, Jean to Goodsprings, 1937.*

_____, 1996. NDOT Project No. SPSR-161 (1).

_____, 2002. http://www.nevadadot.com/reports_pubs/nv_crashes/1998.

Nevada Division of Water Resources (NDWR), 2001. Well log data base. http://ndwr.state.nv.us/IS/wlog/wlog.htm

Nevada Division of Wildlife (NDOW), 2002. *2001 Desert Bighorn – Hunter Checkout Summary – Final*, March 8, 2002.

Nevada Land Classification Status Map, 1965. USGS.

Nevada Natural Heritage Program, Department of Conservation and Natural Resources, 2002. Letter dated April 15, 2002 from Eric S. Miskow, Biologist III/Data Manager to George High, Parsons.

Nevada Public Utilities Commission, 2002. http://puc.state.nv.us/ELECTRIC/propgen.pdf, June 2002.

Nevada State Demographer, 2002. 2000 Official Estimates,http://www.nsbdc.org/demographer/pubs/pop_increase.html

O'Connell, James F., Kevin T. Jones, and Steven R. Simms, 1982, Some Thoughts on Prehistoric Archaeology in the Great Basin. In *Man and Environment in the Great Basin,* edited by David B. Madsen and James F. O'Connell, pp. 227-240. Society for American Archaeology Papers 2. Washington.

O'Connor, Carol A., 1994, A Region of Cities. In *The Oxford History of the American West,* edited by Clyde A. Milner, Carol A. O'Connor, and Martha A. Sandweiss, pp. 535-563. Oxford University Press, New York.

PBS&J, 2002. *Draft Environmental Impact Statement Table Mountain Wind Generating Facility.*

Peak and Associates

1988a *Summary of the Woodward-Clyde Consultants 1988 and the Dames and Moore 1987 Cultural Resource Reports for the Williams Telecommunication and Spring Fiber Optic*

Cable Lines in Clark County, Nevada. Prepared for American Telephone and Telegraph Company, Pleasanton, California. BLM Report Number 5-1916(P).

1988b *Addendum to CR5-1916(P) Test Excavations of Areas In and Near the Proposed Roach Lake Archaeological District, Clark County, Nevada.* Prepared for Reinert Environmental Permitting, Inc., Cave Creek, Arizona and AT&T, Pleasanton, California.

Pendleton, Lorann S.A., Alvin R. McLane, David Hurst Thomas, 1982, *Cultural Resource Overview Carson City District, West Central Nevada.* Cultural Source Series Monograph No. 5. Bureau of Land Management, Reno.

Petersen, F.

1994 *Cultural Resources Report on the Proposed Valley Electric Association Powerline From Boulder City to Parumph, Clark and Nye Counties, Nevada.* BLM Report Number 5-2248(P). Prepared for Environmental Research Center of Missouri, Inc., Jefferson City, Missouri. S&S Archaeological Consultants, Minden, Nevada.

Power Engineers, Inc., 2002. *Northwest Service Upgrade – Centennial Plan for the Harry Allen – Northwest 500 kV Transmission Line Environmental Assessment*, March 2002.

Rafferty, Kevin

1982 *Las Vegas-Reno ORV Race 82-3(Frontier 500)* . CR Report Number 5-1043(P). Submitted to USDI Bureau of Land Management, Las Vegas District.

1984 *On Common Ground: Las Vegas as a Cultural Frontier in Prehistory.* Nevada Division of Historic Preservation and Archaeology, University of Nevada, Las Vegas.

1985 *A Cultural Resource Investigation of a Power Line Right-of-Way Near Goodsprings, Clark County, Nevada.* DAS Report 5-71-5. BLM Report Number 5-1480(N). Division of Anthropological Studies, Environmental Research Center, Museum of Natural History, University of Nevada, Las Vegas.

1989 *A Cultural Resource Inventory of Five Well Locations and Two Water Pipeline Rights-of-Way in Clark County, Nevada, and San Bernardino County, California.* DAS Report 5-94-2. BLM Report Number 5-1935(P). Division of Anthropological Studies, Environmental Research Center, Museum of Natural History, University of Nevada, Las Vegas.

1991 *A Cultural Resource Inventory of a 14 Mile Long Powerline Right-of-Way in the Eldorado Valley, Clark County, Nevada.* BLM Report Number 5-2139(P). Salt River Project, Phoenix Arizona. Report on file at Archaeological Research of Southern Nevada, Las Vegas, Nevada.

1994 *Cultural Resources Inventory Negative Report.* BLM Report Number 5-2251. Submitted to the USDI Bureau of Land Management, Las Vegas District. Knight & Leavitt Associates, Inc.

Relocation.com, 2002, Internet web site http://classic.relocationcentral.com/directory/us/nv/las-vegas/moreinfo.html#EDUCATION.

Reynolds *et al.* 1991a and 1991b.

1991a. Reynolds, R.E., Reynolds, R.L., Bell, C.J., Czaplewski, N.J., Goodwin, H.T., Mead, J.I., and Roth, B., 1991(a). The Kokoweef Cave Faunal Assmblage. IN: *Crossing the Borders: Quarternary Studies in Eastern California and Southwestern Nevada*, San Bernardino County Museum Special Publication MDQRC 1991, pg. 97-103.

1991b. Reynolds, R.E., Reynolds, R.L. Bell, C.J., and Pitzer, B., Vertebrate Remains from Antelope Cave, Mescal Range, San Bernardino County, California. IN: *Crossing the Borders: Quarternary Studies in Eastern California and Southwestern Nevada*, San Bernardino County Museum Special Publication MCQRC 1991, pg. 107-109.

1991c. Reynolds, R.E., Reynolds, R.L., and Bell, C.J., The Devil Peak Sloth. IN: *Crossing the Borders: Qurternary Studies in Eastern California and Southwestern Nevada*, San Bernardino County Musium Special Publication MDQRC 1991, pg. 115-116.

Roberts, Heidi, Elizabeth Von Till Warren, Richard V.N. Ahlstrom, and Claudia Woodman, 2002, Archaeological Survey for the Table Mountain Wind Generation Project, Clark County, Nevada. Report on file, Las Vegas District Bureau of Land Management.

Rolf, Stanton

19 *Clark County Public Works Department Solid Waste Transfer Stations.* BLM Report Number 5-2261(N). Report on file, Las Vegas District Bureau of Land Management.

1996a *Tortoise Relocation Project.* BLM Report Number 5-2342. Report on file Las Vegas District Bureau of Land Management.

1996b *Sand And Gravel Material Sale From Eugene Callahan.* BLM Report Number 5-2324(N). Report on file at Las Vegas District Bureau of Land Management.

Rogers, A.M., *et al.* 1991. The seismicity of Nevada and some adjacent parts of the Great Basin. In *Neotectonics of North America.* Geological Society of America Decade Map. Edited by D.B. Slemmons, *et al.* Vol 1, pp, 153-84.

Rogers, A.M., and W.H.K. Lee, 1976. Seismic study of earthquakes in the Lake Mead, Nevada-Arizona region. *Bulletin of the Seismological Society of America* 66:1657-81.

Rowley, William D., 1989, Ranching and Farming in Nevada. In *Nevada Comprehensive Preservation Plan,* Richard A. Bernstein and Ronald M. James, editors, pp. 1-3 to 1-35. Division of Historic Preservation and Archaeology and the Nevada Historical Society, Carson City.

Schroeder, Albert H., 1975, The Hohokam, Sinagua, and the Hakataya. *Occasional Paper No. 3. IVC Museum Society Publication.* El Centro.

1979 Prehistory: Hakataya. In *Handbook of North American Indians: Southwest Volume 9*, edited by A. Ortiz, pp. 100-107. Smithsonian Institution, Washington, D.C.

Scott, E., 2002. San Bernardino County Museum. Personnel Communication.

Scott, E., 2002. Paleontological Literature and Records Review, Diamond Generating Corporation Ivanpah Energy Center Project, Southern Nevada. Report on file, San Bernardino County Museum.

Seleba, S. and Hess, J.W., 1998. Geological characteristics of Desert and Upper Desert Caves (NE Blue Diamond Hill, Nevada, USA). Acta Carsologica 27(2): 265-283.

Seymour, Gregory, Deni J. Seymour, Pamela Lawrence, Indre Antanaitis, and Lynn E. Hatzenbuehler, 1996, *Archaeological Survey of 4,410 Acres in the Las Vegas Valley near Black Mountain, Clark County, Nevada.* Bureau of Land Management Report 5- 2322, Las Vegas.

Shelp, S., BLM Las Vegas Field Office Recreation Specialist, "*Spring Mountain Perimeter Trail*" Fact Sheet, 2002.

Shutler, Richard, Jr.

1961 Lost city: Pueblo Grande de Nevada. *Nevada State Museum Anthropological Papers 5.* Carson City.

1967a Cultural Chronology in Southern Nevada. In *Pleistocene Studies in Southern Nevada,* edited by H.M. Wormington and Dorothy Ellis, pp. 304-308. Nevada State Museum Anthropological Papers 13. Carson City.

1967b Archaeology of Tule Springs. In *Pleistocene Studies in Southern Nevada,* edited by H.M. Wormington and Dorothy Ellis, pp. 298-303. Nevada State Museum Anthropological Papers 13. Carson City.

Slemmons, D.B., J.W. Bell, C.M. dePolo, A.R. Ramelli, G.R. Rasmussen, V.E. Langenheim, R.C. Jachens, K. Smith, and J. O'Donnell. 2001. Earthquake Hazard in Las Vegas, Nevada, in Luke, Jacobson & Werle, eds., Proceedings of 36th Annual Symposium on Engineering Geology and Geotechnical Engineering: University of Nevada, Las Vegas, March 28-30, 2001, p. 447 – 459.

Smart, William B., 1994, Utah's Historic Trails. In *Utah History Encyclopedia,* edited by Allan Kent Powell, pp. 563-565. University of Utah Press, Salt Lake City.

Southern Nevada Environmental, Inc., 2001. *1999-2001 Biennial Report July 1, 1999 through June 30, 2001, Clark County Desert Tortoise Transfer and Holding Facility, Desert Tortoise Conservation Center & Desert Tortoise Translocation Program*, November 20, 2001.

Springer, K., 2002. San Bernardino County Museum. Personnel Communication.

State of Nevada Noxious Weed List. http://www.state.nv.uslnvnhp/noxious.htm.

Steward, Julian H., 1938, *Basin-Plateau Aboriginal Sociopolitical Groups*. Reprint. University of Utah Press, Salt Lake City. Originally printed in 1938, Smithsonian Institution Bureau of American Ethnology Bulletin 120, United States Government Printing Office, Washington, D.C.

1974 Aboriginal and Historic Groups of the Ute Indians of Utah: An Analysis with Supplement (1954). In *Ute Indians, I. (American Indian Ethnohisotry: California and Basin-Plateau Indians)*, pp. 9-328. Garland, New York.

Stewart, J.H. and Carlson, J.E., 1978. Geologic map of Nevada: Nevada Bureau of Mines and Geology, 1:500,000 scale.

Stewart, J.H., 1980. Geology of Nevada: Nevada Bureau of Mines and Geology, Special Publication 4.

Stewart, Omer C., 1942, Culture Element Distributions, XVIII: Ute-Southern Paiute. *University of California Anthropological Records* 6(4):231-356.

Stornetta, Susan and Kenneth E. Juell

1987 *Cultural Resource Inventory and Evaluation for Williams Telecommunication Company's Fiber Optic Cable Right-of-Way: Nevada-Utah State Line to California-Nevada State Line.* Prepared for Williams Telecommunication Company, Tulsa, Oklahoma. BLM Report Number 5-1725(P). Woodward-Clyde Consultants, Walnut Creek, California.

Susia, Margaret L., 1964, *Tule Springs Archaeological Surface Survey.* Nevada State Museum Anthropological Papers 12 .

Swanson, Mark T., 1995, Chapter 4 Historical Period. In *A Class III Cultural Resources Survey for the Southern Nevada Water Authority Treatment and Transmission Facility, Clark County, Nevada.* Statistical Research Technical Series No. 55, Tucson.

SWCA, Inc. Environmental Consultants

1995 *The Mead to Phoenix 500kV Transmission Line Project: An Archaeological Survey of Expanded Right-of-Way for Cable Pulling at Eleven Point-of-Turn Towers.* Prepared for Salt River Project. BLM Report Number Misc#95A. Report on file SWCA, Inc., Phoenix, AZ.

Talbot, Richard K., Scott E. Billat, and Lorna Beth Billat

1989 *A Class I Overview of the Proposed Wycal Pipeline Corridor Through Utah and Nevada.* BLM Report Numbers 5-1948(P) and 5-2108(P). Prepared for the Wyoming-California Pipeline Company. Brigham Young University Museum of Peoples and Cultures Technical Series No. 89-30.

Talbot, Richard K., Scott E. Billat, Lane D. Richens, Don Southworth, Shane Baker, Teri Christensen, Daren Richards, and James D. Wilde

1991 *A Cultural Resource Inventory of the Proposed Wycal Pipeline Through Southern Nevada.* BLM Report 5-2108(P). Prepared for Wyoming-California Pipeline Company. Brigham Young University Museum of Peoples and Cultures Technical Series No. 90-10 (Nevada).

Thomas, David H., 1981, How to Classify the Projectile Points from Monitor Valley, Nevada, *Journal of California and Great Basin Anthropology* 3(1):7-43.

Thomas, David H. and Robert L. Bettinger, 1976, *Prehistoric Pinyon Ecotone Settlements of the Upper Reese River Valley, Central Nevada.* Anthropological Papers 53d(3):263-366. American Museum of Natural History, New York.

Thomas, D. Hurst, L.S.A. Pendelton, and S.C. Cappannari, 1986, Western Shoshone. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 161-283. Handbook of North American Indians, Vol. 11, W.C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Thomsen, Greg

1978a *N5-78-27 Southern Nevada Jackrabbits Hare Scrambles.* CR Report Number 5-429(N). Submitted to the USDI Las Vegas District Office, Stateline Planning Unit.

1978b *N5-78-9 WRA Shamrock 350 Buggy Race.* CR Report Number 5-377(N). Submitted to the USDI Las Vegas District Office, Stateline Planning Unit.

Thomsen, G. and D. Wolf

1978*Chargers West Hare Scrambles Motorcycle Count - SRUP N5-78-7.* CR Report Number 5-374(N). Submitted to the USDI Las Vegas District Office; Stateline Resource Area.

Tucker, Gordon C., Jr. and Paul R. Nickens

1983a *Results of Archaeological Investigations Along the Nevada Section of the Proposed Intermountain Power Project (IPP) Intermountain-Adelanto Line 1 (Revised).* BLM Report Number 5-1049(P). Prepared for Applied Conservation Technology, Inc., Fullerton, California. Nickens and Associates, Montrose, Colorado.

1983b *Results of Cultural Resources Investigations of the Access Roads Outside the Right-of-Way for the Ivanpah and Kingston Divisions of the Intermountain Power Project (IPP) Intermountain-Adelanto Line 1 in Nevada.* BLM Report Number 5-1304(P). Prepared for Applied Conservation Technology, Inc., Fullerton, California. Nickens and Associates, Montrose, Colorado.

Turner, Allen C., and Robert C. Euler, 1983, A Brief History of the San Juan Paiute Indians of Northern Arizona. *Journal of California and Great Basin Anthropology* 5(1-2):199-207.

Undall, Stewart L., 1994, *The Myths of August: A Personal Exploration of Our Tragic Cold War Affair with the Atom.* Rutgers University Press, New Brunswick, New Jersey.

University of Las Vegas, Nevada Archaeological Survey

Nevada State Highway Department, Railroad Pass Material Site Project Number RF-006-1-(28), EA #70685. Report Number 2-13-B.

University of Nevada, Las Vegas, (UNLV), 2001. Center for Business and Economic Research, http://www.unlv.edu/Research_Centers/cber/.

University of Nevada, Reno–Seismological Laboratory. 2001. Earthquake Search. www.seismo.unr.edu/index.html

URS Corporation, 2001. *Reliant Energy Bighorn Environmental Assessment.*

U.S. Census Bureau, 2002. Census 2000 Summary File 1 (SF-1), Population, Housing Units, and Density: 2000, http://www.factfinder.census.gov

_____, 2002. Census 2000 Summary File 1 (SF-1), Profile of General Demographic Characteristics: 2000, http://www.factfinder.census.gov

U.S. Department of Energy, Energy Information Administration, "Subsequent Events – California's Energy Crisis," 2002. www.eia.doe.gov/cneaf/electricity/california/subsequentevents.html

U.S. Geological Survey, 1996a. National Seismic Hazard Map, Earthquake Hazard Program. National Siesmic Hazard Mapping Project. http://geohazards.cr.usgs.gov/eq/index.html.

U.S. Geological Survey, National Earthquake information Center. 2001a. Earthquake Search http://www.water.usgs.gov/nwis.

Warren, Claude N. and Robert H. Crabtree, 1986, Prehistory of the Southwestern Area. In *Handbook of North American Indian, Volume 11: Great Basin*, edited by Warren L. D'Azevedo, pp. 183-193. Smithsonian Institution Press, Washington.

Wedding, Jeffrey R.

2001 *Cultural Resource Inventory for Nevada Pipe Storage Yards, Contractor Yards and Offloading Sites Issued for Supplemental Filing to Docket No. CP01-422-00. Addendum IV to: Cultural Resource Class I and Class III Investigations For The Proposed 2003 Kern River Expansion Project, Nevada.* HRC Report 5-150-14(10). Prepared for Williams Gas Pipeline. Harry Reid Center for Environmental Studies, Marjorie Barrick Museum of Natural History, University of Nevada, Las Vegas.

Wernicke, B. *et al.*, 1988. Basin and Range extensional tectonics at the latitude of Las Vegas, Nevada: Geological Society of America Bulletin, Vol. 100, p. 1738-1757.

White, William G.

1997 *Cultural Resource Investigations of the Power Transmission Lines/Facilities and Portion of the Out-Valley Southern Nevada Water Authority-Treatment and Transmission Facility, Clark County, Nevada.* HRC Report 2-8-8. Submitted to Southern Nevada Water Authority. Harry Reid Center for Environmental Studies, Marjorie Barrick Museum of Natural History, University of Nevada, Las Vegas.

Williams, Joseph O.I.

1975a *Proposed Section 4 Project for Construction of Well sites and Installation of Well Improvements.* BLM Report Number 5-107(N). Submitted to USDI Bureau of Land Management, Las Vegas District.

1975b *Cultural Resources Survey for the Proposed Jean State Prison Site, R. & P.P. Application N-11732.* CR Report 5-75(N). Submitted to USDI Bureau of Land Management, Las Vegas District.

1977a *N5-77-12 So. Nev. Jackrabbits Desert Race.* CR Report 5-259(N). Submitted to USDI Bureau of Land Management, Las Vegas District, Stateline Planning Unit.

1977b *N5-78-5.* CR Report 5-260(N)B. Submitted to USDI Bureau of Land Management, Las Vegas District, Stateline Planning Unit.

1977c *N5-77-4 Gamblers Hare Scrambles Motorcycle Race.* CR Report 5-260(N)A. Submitted to USDI Bureau of Land Management, Las Vegas District, Stateline Planning Unit.

1979 *Taco Bell Beaners European Scrambles Desert Motorcycle Race, N5-79-19.* CR Report 5-191(N). Submitted to USDI Bureau of Land Management, Las Vegas District.

Williams, Joseph O.I. and Stanton D. Rolf

1977 *Rocket Car Trail N5-77-11.* CR Report 5-275(N). Submitted to USDI Bureau of Land Management, Las Vegas District.

Young, Bertrand T.

1990a *Archaeological Inventory of the Nevada Portion of the Wyoming-California Pipeline Company's Proposed Piute Lateral in Clark County, Nevada.* BLM Cultural Resources Report Number 5-1968. Prepared for the Wyoming-California Pipeline Company, Colorado Springs, Colorado. Archaeological Research Services, Inc. Virginia City, Nevada.

1990b *Archaeological Inventory of the Proposed McCullough II Substation Site and Two 500kV Tie Lines in Clark County, Nevada.* BLM Cultural Resources Report Number 5-1992. Prepared for the City of Los Angeles, Department of Water and Power and Higman Doehle Inc. Report on file at Archaeological Research Services, Inc. Virginia City, Nevada.

Zale, Thomas F.

1984 *Barstow to Vegas ORV Race Course Re-Reroute.* CR Report 5-1404(NV). Submitted to USDI Bureau of Land Management, Las Vegas District.

1985 *NV5-84-51: A Special Recreation Permit for the Proposed 1985 Frontier 500 Off-Road Vehicle Race.* Report Number 5-1464(N). Submitted to USDI Bureau of Land Management, Las Vegas District Office.

Zoback, M.L. *et al.*, 1981. Ceinozoic evolution of the state of stress and style of tectonism of the Basin and Range province of the western United States. Philosophical Transcripts of the Royal Society of London, Vol. 300, p. 407-434.

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